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ON SULPHITE OF MAGNESIA.

By JOSEPH P. REMINGTON, Brooklyn, N. Y.

This salt having been in request lately, the authorities at the writers command were searched for a formula for its preparation. It did not appear to be a frequent subject for examination, and the published investigations seemed rather meagre and wanting in details.

The only formula appearing, was one from Wittstein's Vierteljahresschrift, as follows:—"Sulphite of Magnesia may be prepared by passing sulphurous acid gas through water holding carbonate of magnesia in suspension; but the salt so obtained is not quite white. A better way is to dissolve 136 parts of crystallized sulphite of soda, free from carbonate and sulphate, in the smallest quantity of hot water and to filter into this hot liquid a concentrated solution of 123 parts of Epsom Salts, the mixture to be stirred until cold. The mass of fine crystals which form are allowed to drain on a strainer, then pressed and dried at a moderate heat. The product should weigh 69 parts."

It is not an uncommon occurrence to find the sulphite of soda of commerce contaminated with sulphate and carbonate, and if made with anything but a freshly prepared sulphite of soda, the yield would be diminished in proportion to the extent of the contamination. There is besides in the above process a small yield of the sulphite of magnesia compared with the quantities

of the two salts taken, and the yield was much less than that stated, in the writer's hands. Having had the same experience with regard to saturating the carbonate, suspended in water, with sulphurous acid gas a somewhat different plan was adopted.

Five grammes Jennings's Magnesia (re-calcined) was made into a thick *smooth* paste, with 10 c.c. of distilled water; to this was added slowly with stirring 102 c.c. of aqueous sulphurous acid, sp. gr. 1.037. The liquid on the surface now showed an acid reaction and had a yellow color; after standing a few minutes the supernatant liquid was decanted; the crystals were then placed on a tared filter and washed with distilled water until the washings came through colorless, and a small portion, on being tested with chloride of barium, produced a precipitate which was almost entirely dissolved by hydrochloric acid. The filter and contents were then dried at a temperature not exceeding 100° F., and weighed 15.310 grammes, which was 3.06 times the weight of the magnesia used, or 306.2 per cent.; the theoretical yield should have been 3.95 times the quantity of magnesia started with.* The loss is owing principally to oversaturation, as sulphite of magnesia is very soluble in aqueous sulphurous acid, but it was thought to be best to secure the conversion of the whole of the magnesia by oversaturating, since the excess of sulphurous acid can easily be disposed of by decantation, and, after draining and washing, the crystals are of course free from acid. The sulphite of magnesia as obtained was in very small white crystals, having the peculiar taste of the sulphites, though, on account of its insolubility, the taste was not so disagreeable as that of the more soluble sulphites of soda and potassa. The process was tried on a somewhat larger scale and succeeded. Eight ounces av. of Jennings's Calcined Magnesia was made into a smooth paste with a pint of distilled water and aqueous sulphurous acid U. S. P., sp. gr. 1.035, was added with stirring, until the liquid gave a slight acid reaction; the crystals formed were then allowed to subside, and the clear liquid was decanted; the sulphite of magnesia was then drained on a muslin

* This is the average of several experiments, all conducted on the same plan and with the same quantities, and represents about what the results would be in ordinary practice.



strainer and washed with distilled water until free from impurities, then again allowed to drain, and dried on bibulous paper; the yield was 1 lb. 8 oz. of dry crystals. The washing can be accomplished most effectually, and with the use of the least water, by allowing the crystals to collect in a stratum on the bottom of the strainer, and then adding just enough distilled water to cover the surface; any sulphate of magnesia is dissolved, and this together with the yellow mother water is displaced by the descending clean water, and the salt is left perfectly white. By this process sulphite of magnesia can be obtained as pure and white as by double decomposition, with economy in the most valuable items, time and labor, the yellow coloration all disappearing by the simple process of washing, and the loss in washing is small, as the salt is difficultly soluble in cold water. The yellow color seems to be caused by an impurity soluble in sulphurous acid (believed to be iron) and it only appears when the acid is in excess, and is therefore a good indication that the magnesia is all converted into sulphite. When made from Henry's magnesia, no yellow color was visible during any step in the process. It is almost needless to say that it was not found profitable to evaporate and recrystallize the mother water.

SYRUPUS FERRI IODIDI.

BY EDWARD R. SQUIBB, M. D.

The difficulty of keeping this preparation without change has again been discussed of late in the *London Pharmaceutical Journal*, and the insufficiency of the various plans resorted to have been pretty well shown in these discussions, and in the communications elicited thereby.

In a very considerable experience with the last official process (U. S. P.) the writer has only once seen the syrup become discolored. In this instance a syrup made in September and put up in pound bottles, was found to be all somewhat discolored, though not uniformly so, and all shading off from the surface downward, in January following. This single instance, however, proves that even under ordinary good care and nearly uniform management, some slight accident may determine a liberation of

iodine. Dusty bottles, the use of corks instead of glass stoppers, and many other such apparently trivial matters will often start or favor this change, though no such causes can be found in the instance referred to.

In estimating the amount of iodine liberated in this change it was found to be exceedingly small, and practically quite insignificant, even in those bottles which were of the deepest color. No deposit had occurred in any of the bottles, however, and it is doubted whether a deposit ever occurs in any well managed preparation made by any of the later processes. It having been thus shown that the medicinal properties were not materially impaired by this change, since the amount of free iodine was too minute to produce any effect even upon the most delicate condition, a remedy for the discoloration was sought for upon chemical principles, and was soon found in the hyposulphite of soda, and it is the object of this note to publish a method of using the remedy. A solution of fifteen or twenty grains of crystallized hyposulphite of soda in one fluidounce of water is strong enough for the purpose, and from fifteen to twenty minims of this solution is sufficient for each pound of the syrup when the latter is not of a darker color than brown sherry wine. When darker than this, double the quantity is required. The solution is simply added to the discolored syrup in the bottles and shaken up at ordinary temperatures. Syrup so restored is afterward much less susceptible to the change, and the writer has now a specimen which has been freely exposed to the air in a graduated measure for four weeks or more, without any appearance of change even on the surface. The quantity of the solution required to restore the syrup is a measure of the amount of change which may have taken place. The restored syrup is not of the full original green color, but rather more inclined to olive or a very pale brown, and is not quite as transparent. This latter is probably due to the precipitation of a minute quantity of finely divided sulphur.

This remedy having succeeded in one single instance, is considered reliable only so far as its chemical principles are concerned, and is only published in order that its applicability may be tested; and the writer suggests to those interested in the

subject who have time to investigate it practically and particularly, to ascertain whether the addition of a minute proportion of hyposulphite of soda to freshly made syrup would not secure it against change.

Brooklyn, Feb. 1, 1868.

PHARMACEUTICAL NOTES.

By C. LEWIS DIEHL.

CHLORATES OF THE CINCHONA ALKALOIDS.

The quinia salt has lately been quite frequently called for in this city, and for some time I had considerable difficulty in preparing a handsome article. As I was unable to obtain chlorate of baryta in this city, I tried various methods to avoid its use, but finally was compelled to prepare some of the baryta salt, and then following the process of Tichborne, as near as I recollected, for preparing chlorate of quinia, obtained a very handsome product. For the convenience of those that are unable to procure, or wish to prepare chlorate of baryta, I have appended below the formula for preparing this salt, which is essentially that of Bottger, as given in Graham Otto's *Lehrbuch der Chemie*.

Chlorate of Quinia. Heat 1 gallon of distilled water, to which a small quantity of solution of chlorate of baryta has been added, to near the boiling point, and gradually add 5 oz. of pure sulphate of quinia. Then add solution of chlorate of baryta in fractional quantities, until a portion of the liquid, when filtered from sulphate of baryta, is no longer precipitated by the baryta salt, and forms a decided precipitate on the addition of dilute sulphuric acid. Now filter the solution and allow it to stand for 24 hours, when the chlorate will have crystallized in handsome acicular needles, which are arranged in mushroom-shaped tufts. Drain the crystals in a funnel, and dry in the air on filtering paper, placed on a porous tile.

By following these directions the operator cannot fail to obtain a handsome product. The first portions of the filtrate, as they drop into a cold vessel, will appear milky; but, as the filtrate accumulates, the precipitate is redissolved, and the solution remains clear until all is filtered. This circumstance will serve as

a guide to the proper concentration of the solution; for if the solution is more concentrated, the crystals formed will be very small; if less concentrated, it will crystallize in needles an inch or more in length frequently, which when dry possess a pearly lustre, and in individual tufts are very handsome, but present a very poor appearance in bulk. The mother liquors will yield another crop of crystals, but are best reserved for a future operation. A small amount of chlorate of baryta is recommended to be added to the hot water before the addition of the sulphate of quinia, as by that means the latter appears to dissolve more rapidly.

The dried salt, as thus prepared, is perfectly white, and presents a very handsome appearance. It is but sparingly soluble in cold water, but freely soluble at a boiling temperature. It is very freely soluble in alcohol and chloroform, and freely soluble in ether. Placed on heated platinum foil, it forms small oily globules, and immediately thereafter deflagrates, leaving no residue.

Bichlorate of Quinia. During my experiments on the chlorate of quinia I decomposed some bisulphate of quinia with chlorate of baryta, adding the latter to exact saturation. The filtered solution was evaporated to a syrupy consistence, and allowed to stand in a cool place for a number of days, to permit the formation of crystals. No crystals having formed, it was evaporated carefully to dryness, by which it unfortunately became somewhat colored.

This product has a brownish tinge, is freely soluble in cold and boiling water, moderately freely soluble in alcohol, but apparently insoluble in ether or chloroform. When placed on heated platinum foil it immediately explodes with great violence, leaving no residue. I have made no further experiment with this compound, but consider it probable that by proper manipulation a crystalline compound may be obtained.*

Chlorate of Cinchonia. This salt may be prepared from sul-

[* *Perchlorates* of the Cinchona alkaloids are described in the 17th volume of Gmelin's Handbook, made by precipitating their sulphates by perchlorate of baryta. They are all crystalline.—EDITOR AMER. JOURN PHARM.]

phate of cinchonia in the same manner as the quinia salt, using, however, but five-eighths the quantity of water. In manner and form of its crystallization it resembles most closely the quinia salt. It is sparingly soluble in cold water, but apparently more freely than the quinia salt. It is freely soluble in alcohol and chloroform, and very sparingly (if at all) in ether. Placed on heated platinum foil it immediately deflagrates, leaving no residue.

Chlorate of Quinidia may be prepared from sulphate of quinidia in the same manner as chlorate of quinia. This salt crystallizes quite distinctively from the preceding salts, forming solid tubular crystals, which are evidently derived from the rhombic system. It is more sparingly soluble in cold and boiling water than either the quinia or cinchonia salts, moderately soluble in alcohol and chloroform, and apparently insoluble in ether. Placed on heated platinum foil it immediately deflagrates, leaving a small percentage of charcoal.

Solution of Chlorate of Baryta. A. Dissolve 15 oz. tartaric acid in 2 pints of distilled water, add gradually 14 oz. carbonate of soda (in clear crystals), and filter. This forms *bitartrate of soda*.

B. Dissolve 12 oz. pure chlorate of potassa in 2 pints warm distilled water, and filter into solution A. Evaporate to 2 pints, allow to cool, and filter from precipitate. By double decomposition *chlorate of soda* is formed, which remains in solution, and *bitartrate of potassa* is precipitated.

C. Dissolve 12 oz. oxalic acid in 2 pints water, at a temperature not exceeding 112° F., and filter into solution B. Mix the solutions thoroughly, and expose to a freezing mixture until the temperature has fallen below 32° F., and the precipitate has perfectly subsided; then decant the clear liquid from precipitate, express the residue, and after filtering the expressed liquid add to the decanted portion. The oxalic acid liberates the chloric acid, forming sparingly soluble oxalate of soda, which, by aid of the freezing mixture, is almost entirely precipitated. A small proportion of free oxalic and tartaric acids and oxalates of soda and potassa now contaminates the *solution of chloric acid*, which is otherwise pure.

D. Saturate decantate C with a slight excess of recently precipitated moist carbonate of baryta, filter the solution, evaporate to 2 pints, and again filter.

Thus is formed the *solution of chlorate of baryta* used by me, which is tolerably free from impurity, as the oxalic and tartaric acid contained in the solution of chloric acid unite with baryta to form very sparingly soluble baryta salts, leaving the solution contaminated only with small amounts of chlorate of soda and potassa, which do not interfere in the least in the subsequent preparation of the salt of the alkaloids.

Ferrocyanate of Quinia. The only formula at my command for preparing this compound is that given in the U. S. Dispensatory (from A. J. Ph. xii. 351). This formula directs that 2 parts sulphate of quinia be boiled with 3 parts ferrocyanide of potassium, in a very little water; to pour off the liquor from a greenish-yellow substance, which is then to be washed with distilled water, dissolved in strong alcohol, at 100° F., the solution filtered and evaporated to dryness. When I first prepared the compound according to this formula I obtained a yellow alcoholic solution, which when evaporated on a water-bath was gradually turned quite green, and when dry formed a greenish-yellow powder. Dissatisfied with this result, I prepared another lot, allowing the alcoholic solution to evaporate spontaneously, and the result was a *light yellow substance*. Pelouze found this preparation to be a mixture of pure quinine with a little Prussian blue. It is difficult to comprehend how a mixture of quinine and Prussian blue would form a light yellow compound, and I therefore suggest that it is possible he operated on a ferrocyanate, the alcoholic solution of which had been evaporated by heat. It is evident that the compound, whatever it may be, is decomposed by heat when in alcoholic solution, and the coloration is such as might be produced by the formation of Prussian blue in a yellow solution. From these facts I am inclined to believe that the light yellow ferrocyanate is a true compound, which is, however, very readily decomposed by heat.

Elixir Calisaya and Elixir Calisaya Ferrata. Within the last few years these elixirs have become quite popular, and are

consequently put up in various forms and of various compositions. The chief trouble that I have experienced in these preparations has been their tendency to form precipitates or become darkened by age; but until lately I have not made any decided effort to overcome these objections. The most popular elixirs now possess very little or but a pale yellow color, and I here offer a formula that will furnish a preparation, which, containing the usual quantity of calisaya bark and aromatics, has but very little color, will mix with pyrophosphate of iron, in any desirable proportion, without changing, and will remain perfectly bright and transparent.

1. Take of calisaya bark 24 oz., orange peel 16 oz., coriander 4 oz., cinnamon 3 oz., cardamom $1\frac{1}{2}$ oz., anise 1 oz. Bruise these ingredients finely, moisten with a menstruum consisting of 6 parts by measure of water and 2 parts alcohol, .835, and pack into an appropriate percolator, in which allow it to macerate for 24 hours. Then add the same menstruum until 5 gallons of percolate is obtained.

2. From 5 pints (or more if required) of solution of tersulphate of iron prepare hydrated sesquioxide of iron, according to the direction of the U. S. Pharm. Mix the product thus obtained with the percolate (1), and shake frequently for 3 days, or until a portion filtered off has but a slight yellow color. Then express the liquid from the precipitate, and filter through paper.

3. Dissolve $\frac{1}{2}$ oz. oil of orange (fresh) in $1\frac{1}{2}$ oz. alcohol fort., triturate with 8 oz. carbonate of magnesia, and gradually add filtrate (2). Agitate well, and filter on 220 oz. of sugar, which dissolve by agitation, and filter.

If desirable, the simple elixir may be colored with a mixture of caramel and cochineal, as solutions of the latter become gradually darkened by the pyrophosphate of iron.

The samples that I made, 3 months ago, of ferrated simple and colored elixir, are at this date perfectly bright, and indicate no inclination to change, although freely exposed to light and air.

Louisville, Ky., Jan. 27th, 1868.

ADDITIONAL NOTE RELATIVE TO THE PLANT YIELDING
OSHA ROOT OF NEW MEXICO.

By E. DURAND.

PROF. PROCTER.

My Dear Sir.—I have just read your notice on the *Indian Osha Root*, published in the last May number of the *American Journal of Pharmacy*, (page 202, vol. xxxix).

Your correspondent, Mr. Jacob Krummeck, of Santa Fé, New Mexico,* was very unbotanical in his attempt to describe the leaf of the Osha plant, when he wrote that it had a *small oval leaf*. He was thus mistaking for a leaf the segment or lobe of a large decomposed leaf.

In the new package of Osha roots, sent to you last summer, by the same gentleman, there are large leaves still attached to the crown of the roots, and those leaves are not less than one foot long, including the petiole; they are 3—5 pinnately divided with deeply lacinated segments, rather lanceolate than oval.

When I suggested that an umbelliferous plant with small oval leaves must belong to sections *Saniculeæ* or *Ammineæ*,† and might possibly be referred to the genus *Eryngium*, several species of which possess aromatic roots, I was misled by this description of Mr. K., which gave the Osha plant a *small oval leaf*. But now, that I have seen the large decomposed leaves, my view is entirely changed, without, however, being able, as yet, to determine the plant with any degree of certainty, on account of the absence of the most characteristic parts of a plant, (the

* The package of Osha, sent last summer by Mr. Krummeck, was collected without any flowers or fruit, leaving its real botanical name yet doubtful. The Editor intends pursuing his examination of the root and its peculiar volatile oil and hopes that Mr. K. will make an effort to send him the flowers and fruit of the Osha. This may be done in a letter, by post, by folding the plant (including the stem and just enough of the root to identify it with that heretofore sent) while fresh, then drying it so that it shall not mould, with a few lines giving the color of the flowers and seeds before drying, if they change. W. P., Jr.

† [By a misprint in our May (1867) number, vol. xxxix., page 205, last line, these words are made *Sarriculeæ* or *Mulineæ*, instead of *Saniculeæ* or *Ammineæ*. Our subscribers will oblige the Editor by making this correction on reading this note.]

flowers and ripe seeds), which again Mr. K. has omitted to send you.

Consulting my herbarium and those of the Academy of Nat. Sciences, I find in them specimens of an umbelliferous plant, very common in Western Texas and New Mexico, which I have many reasons to consider as this very Osha plant. It is one that Dr. Engelmann and Gray have described in *Plantæ Lindheimerianæ* under the names of *Daucosma laciniata*; "*Herbaglabra, odore forte, Dauci (undè nomen), caulibus 2-3 pedalis, ramosis, striatis, faretis; foliis ternati-quinati-sectis; segmentis 3-partitis; lobis laciniatis, venosis, lanceolatis.*" This plant is said to cover large patches, of moist prairie land, &c. Thus far this description agrees perfectly with the Osha of Mr. Krummeck. Immersed in boiling water, this root has a very strong smell of carot.

When Mr. K. sends you good specimens of the plants (ripe seeds, flowers and all), I doubt not that I shall be able to determine it with certainty. The vegetation of New Mexico and Texas is nearly as well known as that of Pennsylvania, these regions having been successively visited by excellent botanists and experienced collectors, such as Lindheimer, Fendler, Chas. Wright and others.

E. DURAND.

Philadelphia, Dec. 5th, 1867.

NOTE ON DR. WORMLEY'S TEST FOR FREE SULPHURIC ACID.

Middletown, New York, Jan. 30, 1868.

MR. EDITOR.

Dear Sir.—At the close of a review of Dr. Wormley's work on "Micro-chemistry of Poisons," in the Sept. No. of the Journal, 1867, page 479, reference is made to his test for minute quantities of *free sulphuric acid*, viz., Veratria.

In making an application of this test to detect sulphuric acid in cider vinegar, I failed to get satisfactory reactions, and found that the presence of organic matters, such as grape sugar, cane sugar and extractive, prevented or masked the reactions, giving a brown or black residue.

Pure acetic acid does not interfere with the test.

JAMES T. KING.

NOTE ON GLYCEROLE OF IODIDE OF IRON.

By R. LEWELLEN.

St. Louis, Mo., Jan. 24, 1868.

TO THE EDITOR.

Dear Sir.—Having tried for several years various formulas for the formation of *Liquor Ferri Iodidi*, and having found that sugar would preserve it from the action of oxygen only a short time, I was led to try glycerin as a substitute for the syrup of the U. S. Pharmacopœia. It preserves the Iodide of Iron and, I think, adds to its therapeutic effects. I send herewith a sample which has been exposed to the light for three years. Believing this will meet a desideratum and prove a valuable substitute, I remain, &c.,

R. LEWELLEN.

NOTE BY THE EDITOR.—It has long been known that glycerin will substitute sugar as a preservative from oxidation in the case of iodide of iron. It was suggested at the meeting of the American Pharmaceutical Association, held in Philadelphia, Sept. 1857, by Frederick Stearns, of Detroit, and again by Mr. Gordon, at the Cincinnati Meeting, Sept. 1864, (see the proceedings of those years). The specimen sent, three years old, is in perfect condition, and at the College of Pharmacy, Mr. Stearn's specimen, over ten years old, yet exists in good order, but it is hermetically sealed, just as Mr. Lewellen's specimen is, and hence is free from oxidation. Exposure to the air will gradually change it. We believe a properly made officinal syrup of the iodide of iron, enclosed in small bottles to suit the demand of a business, is the dispenser's best method of protecting this preparation, using dry bottles, closing them effectually and keeping the syrup exposed to the light. Mr. W. A. Tilden (*Pharm. Jour.*, Dec. 1867,) is of the opinion that direct sunlight, in decolorizing previously colored syrup of iodide of iron, deoxidizes it at the expense of the hydrogen of the sugar. Be this as it may, our experience, for many years past, is that the carefully made syrup, put up in vials as above, and kept where the direct sunlight reaches it daily, neither undergoes change of color nor deposits any sediment, and is free from acidity. If, however, a vial is left half full, with the cork imperfect, a coloration commences, followed, after a time, by a sediment.

Dr. Squibb has pointed out a means of restoring the bright color of the iodide when the discoloration is due to free iodine, (see page 99). Mr. Tilden has suggested the plan of keeping the syrup in a large vessel with a tap, and its surface covered with a stratum of olive oil. This plan may apply on a very large scale, but is not to be recommended to the dispenser unless kept in a glass vessel, terminating with a funnel, the neck of which is provided with a faucet or a compressed gum-tube valve, so that the last portions may be drawn off without danger of being mixed with globules of oil. The change which occurs after it is dispensed will not be remedied completely by any of these suggestions. Even a coil of wire, while it keeps the syrup free from free iodine, don't prevent the oxidation and deposit. We believe the moderate change which occurs during the consumption of two ounces of the syrup will not materially injure or modify its therapeutic value.

When very long kept, say for fifteen years, we have known a change in the saccharine matter to occur, by which a dark color and caramel odor was acquired not discharged by agitation with iron filings.

W. P., JR.

PILULA FERRI IODIDI.

T. B. DORSEY.

To the Editor of the American Journal of Pharmacy.

That the pilular form is the best as well as the most convenient mode for prescribing the iodide of iron all, I believe, are ready to admit, and the difficulty attending the preparation of these pills I have no doubt is equally apparent. Many Pharmacutists, as well as myself, have found the present official formula not well suited to the wants of the dispenser. In the officinal process we are directed to evaporate the whole to a pilular consistence, which, when performed with the greatest possible care, is attended with very uncertain results. Sometimes we find our mass, when cool, quite difficult to separate into pills, owing to its extreme elasticity, and when made they will not retain their proper shape. The writer has seen and tried the various published formulas for the preparation of these pills, and has also sought to devise something of his own with a view

to an improvement. The method presented by Mr. Bedford in the American Journal of Pharmacy, xxxvii. 184, forms a more pliable mass than the officinal, and is very convenient for dispensing, but is objectionable, not only on account of the ready tendency to decomposition of the honey used, but it does not furnish so dense a mass and consequently is not so permanent as the officinal pill. After repeated trials I have been led to adopt the following formula which, with ordinary skill and care, will furnish a pill as handsome in appearance as the much esteemed Blancard, and fully equal to the officinal. Great care, however, is necessary in the selection of the reduced iron, as much of it in the market will be found utterly worthless.

Take of Iodine, 80 grains.

Reduced Iron, 40 grains.

Sugar, in fine powder, 100 grains.

Gum Arabic, in fine powder, 20 grains.

Water, 50 minims.

Marshmallow, in fine powder, 80 grs. or q. s.

Rub the Iodine, in a glass mortar slightly warmed, to a fine powder; then add the water and afterwards the reduced iron in small portions. Triturate until the mixture becomes a dark gray color and there ceases to be any indication of free iodine to the usual test.

The sugar and gum arabic are now to be added and the mixture rubbed into a smooth pasty mass. Lastly, add the marshmallow, and when thoroughly incorporated, divide into ninety-six pills.

In forming the pills a small quantity of reduced iron may be used as a dusting powder to prevent them adhering together, and still further protect them from the oxidizing influence of the air. They are now to be only partially dried at a temperature not exceeding 120° F., and when cool coated with balsam tolu. Each pill contains one grain of iodide of iron with an excess of reduced iron, and are perfectly devoid of iodine odor. Pills prepared nearly one year ago, in accordance with the above formula, upon examination show no sign of decomposition.

Dresden, Ohio, Feb. 6, 1868.

ON OXALATE OF IRON.

By J. B. MOORE.

The publication in the January number of the American Journal of Pharmacy, of the communication of Mr. Simms, accompanied by the letter of Dr. Schæffer, of Washington City, on the Oxalate of Iron, has stimulated a demand for it among the apothecaries of this city. I, like perhaps many others in my profession, have received prescriptions for the article without being able to supply it, and in the absence of any *definite* formula for its manufacture, devised the following, which I here present for the convenience of those who may have occasion to make it.

Take of Protosulphate of Iron, (pure) 3 xvij. grs. xxxij.

Oxalic Acid, 3 viij. grs. xxiv.

Water, three and a half pints.

Dissolve the sulphate of iron and oxalic acid separately; the acid in one and a half pints of the water, and the sulphate of iron in the remaining two pints. Strain both solutions through muslin, to remove any accidental impurities; then mix them, and, having stirred the mixture, set it by, that the precipitate may subside. Collect the latter upon a filter and wash with water until the washings pass devoid of acid reaction upon litmus paper. Then dry the precipitate at a temperature not exceeding 120°.

To facilitate solution, the acid in the above formula may be powdered, and the sulphate of iron finely bruised and both afterwards weighed, any loss occurring during the process being supplied by fresh additions of either substance.

As the oxalate is slightly soluble in dilute sulphuric acid, a small loss of the precipitate is sustained by a portion being carried off in the supernatant liquid.

Oxalate of iron is a beautiful canary-colored powder, nearly devoid of smell or taste, and decomposed by the alkalies and their carbonates. These substances are therefore incompatible with it in prescriptions.

The oxalate being a pure and permanent proto-salt of iron, and possessing little or no astringency, and not liable to produce constipation nor any functional excitement or derangement, which the use of other chalybeate salts often induces, and being

so easily borne by persons whose idiosyncrasy debarb the use of other salts of the metal, will, I have no doubt, render it a very popular and useful remedy with the medical profession.

The usual dose, according to Dr. Schæffer, is from two to three grains.

As it is not soluble to any considerable extent either in water, alcohol, syrup or glycerin, I should think that the best mode of administration would be in the form of pill. As much as five grains can be made into a pill of convenient size, but for those who may have an aversion to medicine in this form, it may be prescribed in powder, accompanied by directions that it be mixed with sugar and water, syrup of orange, molasses, or any other palatable and convenient vehicle.

Dr. Schæffer says, "since the first use of oxalate of iron, it has been ascertained that in cases of excessive irritability, when ordinary preparations of iron could not be tolerated, the oxalate was taken with the greatest benefit." (*American Journal of Pharmacy*, January, 1868).

After reading the above, I felt desirous of seeing the oxalate of iron tried in some case in which the other chalybeate preparations could not be taken on account of constitutional peculiarity, and knowing a medical friend whose health has been extremely delicate for some time, and whose anæmic condition imperatively demanded the use of iron, and being also aware that he had tried to take almost every preparation of the metal in the *Pharmacopœia*, but could not find one that he could tolerate, even in the minutest dose; in fact his constitutional susceptibility being so great that he could not bear two drops of the *Tr. Chl. Iron*, without experiencing the most intense headache, excited circulation, &c., I therefore called his attention to the oxalate and induced him to try it, which he did, by commencing with one grain doses, continued for several days, when he increased the dose to two grains, and is now taking three grains three times a day, after meals, which has produced strongly marked tonic effects, unattended by the slightest unpleasant symptom. This would seem to corroborate the statement of Dr. Schæffer.

Dr. Schæffer has made two analyses of this salt, and says that it is "without water of crystallization." (*American Journal Pharmacy*, January, 1868).

Prof. Procter, in a foot note to Dr. Schaeffer's letter, quotes Gmelin, Handbook, vol. ix. p. 156, 1855, which says—

“Artificial oxalate of protoxide of iron contains 2 eq. of water for each eq. of base; whilst the native oxalate (Humboldtite) is only sesqui-hydric.

And Mr. Reynolds, (American Journal of Pharmacy, March, 1867), who has also analyzed it, gives as its formula, FeO , C_2O_3 , $+4\text{HO}$. According to this it would consist of one-third of its weight of water.

This question of its composition should be definitely settled, as it is of importance to the therapist in enabling him more accurately to apportion the dose.

Philadelphia, February, 1868.

SYRUP OF LACTUCARIUM.

By JAMES KENWORTHY.

In reading over the proceedings of the American Pharmaceutical Association, I observed one of the queries propounded by that body was, whether the U. S. P. formula for Syrup of Lactucarium could be improved, and if so, how.

Syrup of Lactucarium, as made by the U. S. P. formula, is a milky, unsightly preparation, with a rank, goatly odor, making it objectionable to delicate or sensitive patients, and as Pharmacutists of to-day have to compete with sugar pellets and powders, it behooves us to make our preparations as agreeable in taste and appearance as possible.

Below I give a formula with which I have been very successful, answering in every particular.

Take of Lactucarium, one troy-ounce.

Sugar in coarse powder, fourteen troy-ounces.

Orange Flower Water, one fluidounce.

Powdered Pumice Stone, two troy-ounces.

Purified Animal Charcoal, one troy ounce.

Diluted Alcohol and water, of each a sufficient quantity.

Rub the Lactucarium with sufficient diluted alcohol, gradually added, to bring it to a syrupy consistence. Then introduce it into a conical percolator and, having carefully covered the sur-

face with a piece of muslin, gradually pour diluted alcohol upon it until half a pint of tincture has passed. Evaporate this, by means of a water bath, at a temperature not exceeding 160°, to two fluidounces; rub this in a mortar with the powdered pumice stone and two troy-ounces of the sugar, then with four fluidounces of water gradually added and filter, letting the filtrate drop into another funnel with a filter and the purified animal charcoal in it; after this has all passed through the filter, gradually pour on water until the filtered liquid measures eight fluidounces, then add the orange flower water and the remainder of the sugar, dissolving by agitation, and strain through coarse muslin.

By following these directions carefully, the result will be a beautifully clear syrup with the flavor and appearance of Auberger's French preparation and all the medicinal properties of that made by the process of the Pharmacopœia.

Philadelphia, Feb. 1868.

SYRUP OF LACTUCARIUM.

By ROBERT F. FAIRTHORNE.

When this is made by the formula of the United States Pharmacopœia, a turbid syrup, having a disagreeable odor, is produced, neither pleasing to the eye nor palate of the fastidious public. In order, therefore, to overcome these objections, without interfering with its medical properties, I have devised the following formula, by which an agreeable preparation is obtained:

R. Lactucarii,	℥i.
Alcoholis Diluti,	q. s.
Ætheris,	℥iss.
Sacchari,	℥xiv.
Syrupi,	q. s.
Aquæ Aurantii Florum,	℥ii.
Aquæ Distillatæ,	℥iv.

Ft. Syrup us.

Rub the Lactucarium (after having been thoroughly bruised) with sufficient diluted alcohol to make it of a syrupy consist-

ence. Introduce it into a percolator, and after having carefully covered the same with a piece of filtering paper, retained in its place by a flat weight (the lid of a glass jar answers well enough) pour on it diluted alcohol in such quantity as to produce half a pint of tincture. Evaporate by means of a water bath, at a temperature below 160° , to two fluidounces. Agitate this product for about ten minutes with the ether. Allow it to rest for five minutes, and draw off the lower dark-colored liquid. Place this in an evaporating dish over a water-bath, and apply heat so long as the odor of ether is perceived. Then filter through cotton, mix with the orange-flower and distilled waters, and add this to the sugar. When dissolved make the syrup measure a pint by the addition of a simple syrup.

This will be a clear, transparent syrup, of a straw color, and possessing the pleasant flavor of the orange flower.

Philadelphia, Feb., 1868.

ON SUPPOSITORIES OF ASSAFŒTIDA.

BY ROBERT F. FAIRTHORNE.

As assafœtida is sometimes ordered by physicians to be administered in the form of suppository, and as there is frequently much inconvenience attending the preparation of the same, as well as delay caused by the difficulty met with in mixing that gum with the butter of cacao, I would bring to your notice the following method for making the suppositories, which will be found to save much time and trouble.

An ethereal fluid extract of assafœtida is first made by the following formula:

R. Assafœtidæ,	℥i.
Etheris Fortioris,	℥iij., ʒvi.
Aquæ,	℥iij.

The gum is cut into pieces about the same size as peas, then agitated occasionally in a bottle with the ether and water for two or three days, by which time the assafœtida will be disintegrated, the water uniting with the gummy portion of the same, forming a soft paste, whilst the ether containing the resin and volatile oil floats above this. The contents of the bottle are strained through

thin muslin, in order to separate any foreign substance, such as chips of wood, sand, &c., from the fluid portion. It is now ready for use, and employed in the following manner:

R. Ext. Assafoetidæ Fl. (ethereal) ʒi., ʒi.

Olei Theobromæ, ʒxij. ut q. s.

Ft. Suppositorii, No. xxiv.

The ethereal extract is placed in a capsule over a water-bath. After the ether is driven off by the heat (which occurs in about five minutes), melt the butter of cacao in the same vessel with the residuum. Stir these well together for a few minutes, and pour into moulds.

It will be found, however, that a dense orange-colored substance persistently remains at the bottom of the vessel, which will not mix with the fat, even though stirred constantly until cool, when this heavy substance will have become solid, and, upon examination, will prove to be resin, from which, however, the volatile odorous principle has been removed by the melted butter.

Each of the suppositories thus made will contain the medicinal virtues of about five grains of the gum. They are uniform in appearance, and possess in a very marked degree the characteristic odor of assafoetida.

Philada., Feb., 1868.

ON THE EXTRACTION OF CANTHARIDIN.

By Dr. A. FUMOZE.

It was shown by Robiquet that the remarkable action of *Cantharis vesicatoria* resides in the properties of the cantharidin; and he extracted this principle by exhausting the flies with alcohol, distilling off the excess of the solvent, and leaving the residue to deposit crystals. Procter suggested, a few years ago, to replace the alcohol by chloroform, inasmuch as this latter liquid dissolves cantharidin with much greater facility than alcohol.

But there arises in both processes the same difficulty in separating the cantharidin from the fatty and other matters by which it is accompanied. To overcome this difficulty it would be

necessary to find a liquid which, whilst exerting no action upon the cantharidin, should have the property of dissolving the substances which have been simultaneously extracted. Bisulphide of carbon possesses this property; and, by taking advantage of this circumstance, it becomes an easy task to prepare cantharidin in a state of purity.

The process is simply as follows:—The crushed flies are exhausted by chloroform, the solution is distilled to dryness at a very gentle heat, and the green residue heated with bisulphide of carbon. By this means the fatty, resinous, waxy, and other matters are dissolved, and the cantharidin remains; this last is thrown upon a filter washed with bisulphide of carbon, and crystallized from chloroform.

It is obvious that, omitting the crystallization, this is at once a quantitative process for the estimation of the blistering principle.

Cantharidin exists in good samples of the flies to the amount of from 4 to 5 parts in 1000; its formula, as usually given, $C_8H_6O_2$, demands revision. Chloroform is the best solvent of this principle, but it dissolves also in acetone, the oils and fats, and, to a smaller extent, in alcohol and ether.

It may be sublimed without change, but its well-known serious effects upon the animal economy render it necessary to use all caution in this experiment. Accompanying this crystalline body, upon which the activity of cantharidin depends, is a number of others, the most notable of which as regards quantity is the fat.

The following are the substances which have been extracted from the blistering-beetle, together with the action of various solvents.

1. Cantharidin; soluble in chloroform, insoluble in bisulphide of carbon.
2. Fat.
3. Resinous matter; soluble in chloroform and in bisulphide of carbon.
4. Waxy matter; soluble in bisulphide of carbon and in boiling alcohol, less soluble in chloroform.
5. Yellow matter.

6. Red matter.
7. Extractive ; soluble in water.
8. Acetic and uric acids.
9. Essential oil.
10. Parenchymatous matter ; insoluble.—*Lond. Pharm. Journ.*,
from *Journ. de Pharmacie et de Chimie*.

ON THE ARTIFICIAL PRODUCTION OF BENZOIC ACID FROM NAPHTHALIN.*

BY DR. ADOLF OTT.

Benzoic Acid is a crystallizable, soft, white body, inodorous when pure, but smelling like gum benzoin when gently warmed ; it usually has a faint aromatic odor, sweetish taste, but produces a burning sensation in the throat. Litmus is feebly reddened by it ; it fuses at 250° Fahr., sublimes at 300° Fahr., and boils at 462° Fahr., yielding a vapor of the sp. gr. 4.27. It exists in benzoin, in the tolu balsam, in the gum of *Xanthorrhæa hastilis*, in castor, and has also been met with in the urine of man and herbivorous animals, &c. Benzoic acid is also found by the oxidation and decomposition of oil of bitter almonds, protochloride of benzoil, hippuric acid, &c., and further by the action of a solution of caustic baryta on populin and other organic compounds. It has hitherto, nevertheless, only been prepared from the gum benzoin, either by subliming the same—a process existing since 1703 (*vide* Turquet de Mayerne, "Pharmacopœia in Oper-medio." London)—or by a process, due to Whœler, which we will here not further describe, as it can be found in nearly any larger hand-book of chemistry. We only will mention that it is used in medicine to some extent, viz., against affections of the throat ; largely in the manufacture of aniline blue ; and for the preparation of tobacco sauces.

This interesting substance, of which the chemical formula is $C_{14}H_6O_4$, has now lately been produced, at a rate allowing the manufacturer large profits, from a substance which, in its crude

* A paper read before the Polytechnic Association of the American Institute.

state, can be got for less than one cent a pound. In the following I will proceed to describe the process, but first mention something about naphthalin:—

This hydrocarbon (formula $C_{20}H_{12}$) was discovered in 1820, by Garden, in the coal-tar of the gas works, and studied by Liebig, Faraday, Wöhler, and others. It is a colorless, inflammable solid, of a burning aromatic taste, and peculiar smell. Its specific weight is 1.048, its melting point 175° , and its boiling point 428° Fahr. It sublimes unaltered in laminæ, and can also be obtained in rhomboidal crystals from its alcoholic solution. It is inflammable, and burns with a very smoky flame. Its derivatives have principally been studied by the celebrated Laurent.

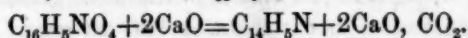
The process now by which this hydrocarbon is transformed into benzoic acid is the following:—

(1). *By the process of Laurent.*—The naphthalin is transformed into the α modification of the bi-proto-chloride of naphthalin, $C_{20}H_8 2Cl_2$.

(2). The bi-protochloride of naphthalin is converted by oxidation into phthalic acid, $C_{16}H_4O_6 2HO$, and the latter into phthalate of ammonia, $C_{16}H_4O_6 2NH_3$.

(3). We obtain then the phthalamid, $C_{16}H_5NO_4$, simply by subjecting the phthalate of ammonia to distillation.

(4). By distilling the product obtained by process 3 with hydrate of lime, benzonitril, $C_{14}H_5N$, is formed.



(5). In boiling the latter with a solution of caustic soda, benzoate of soda is formed, from which benzoic acid is precipitated by hydrochloric acid.

This is, in short, the process as followed by John Castelhay, of Paris, and of which Menier, the Secretary of Class 44 of the International Exhibition in Paris, says that it is the most important discovery made in technical chemistry since the London Exhibition of 1862.—*Chem. News*, Dec. 13, 1867.

ON THE MANUFACTURE OF SALTPETRE.

By J. H. SWINDELLS.

I have lately examined several lots of refuse (muriate of soda, &c.) from various saltpetre makers, and find a serious loss of potash and other materials. The refuse from saltpetre works is mostly sold for manure, either alone or mixed with other substances. From the analysis I give below it will be seen that this refuse in many cases contains a large amount of potash, &c., thus showing bad and careless working.

Analysis of muriate of soda.

Muriate of soda,	.	.	.	.	70.50
Muriate of potash,	.	.	.	.	8.81
Nitrate of potash,	.	.	.	.	6.15

The rest was made up of sulphate of lime, insoluble matter, and water. Another sample showed very near working; it gave me

Muriate of soda,	.	.	.	.	97.13
Nitrate of soda,	.	.	.	.	1.10

Insoluble matter, sulphate of lime, &c., formed the remainder.

Twelve samples of refuse gave me an average of 5.6 per cent. of potash lost in working. Several samples gave me a large amount of insoluble matter, owing, I should imagine, to the "sweeping up" of the factory, and to the muriate of potash, which in many cases I know contains a larger amount of foreign matter than it ought to do, although it is sold, generally speaking, with a guarantee that it contains "80 per cent."

I will now give a short account of the method generally followed in the manufacture, and a recommendation of my own to prevent loss of materials. In all the manufactories I have been able to visit the process was as follows: A certain weight of muriate of potash and nitrate of soda was put into an iron pan along with a quantity of water. The steam was then blown into the "mixture," which is stirred about till such time as it is thought the muriate and nitrate are dissolved. The liquid is then run or syphoned into a tank, and after a certain time the resulting crystals are removed, and invariably refined. The last process is simply done by dissolving down the crystals and re-crystalliz-

ing. I found that no hydrometers were used for ascertaining the density of the liquids, but that everything was done on the "guess" principle. By following this process a loss will always occur; for how is it possible to tell when all the materials have thoroughly dissolved? Moreover, it takes a longer time to dissolve the materials together than it would occupy if the muriate and nitrate were dissolved separately.

The chemical action is too well known to be described here; I will, therefore, proceed to consider the best way of preventing any loss of materials. I would recommend that the muriate of potash should be dissolved in as little water as possible; then dissolve the nitrate of soda also in as little water as may be convenient; add the two solutions together and boil for one hour or so. This will precipitate a portion of the muriate of soda, which may be "fished" out of the pan. The liquid will now be found to have a specific gravity of about 1.200, 1.250, or 1.275, according to the manner in which the "dissolving and boiling" down is conducted. The liquid, after remaining at rest 2 hours or so, may be run into the coolers in the usual way to allow the nitrate of potash to crystallize out of the liquor; of course all the nitrate of potash does not crystallize out. A quantity remains in the "mother liquor," a portion of which may be used for dissolving the raw materials. The mother liquor, however, should not be too strong, as neither the muriate nor nitrate dissolve well in strong mother liquor; about 15 Twaddell will be found about the strength. When the "mothers" begin to increase and become too many for "dissolving" purposes, they must be salted down and crystallized. This is done by placing them in an evaporating pan, and boiling them down to about 35° or so, Twaddell; care must be taken to remove the muriate of soda as it falls to the bottom of the pan. This may be done by means of perforated ladles. There is sure to be a little nitrate of potash clinging to the muriate of soda, and the manner of separating this must be considered. Even when there is so much as 5 per cent. of potash mixed with the muriate of soda, it will scarcely pay to extract it, unless coals are very cheap; for the entire mass would have to be dissolved, and the liquor evaporated down to the crystallizing point. I would recommend the

following plan: As the muriate of soda is taken out of the pans it should be placed in a strong tub with a kind of filter bottom—this tub to be provided with a tight-fitting top, through which a pipe passes for the admittance of steam. After the muriate of soda has been put in this tub and the top secured, the steam is blown through the mass for 15 minutes, and the liquor run off by means of a tap placed at the bottom of the tub. This liquor may be used for dissolving the raw material, and all over and above that required for this purpose must be evaporated down along with the mother liquor. By all means, the manufacturer, if he is not capable of making his own analyses, should have analyses made from time to time of his muriate of soda; he will then be able to form the best opinion of what he is doing, and thus avoid any unnecessary loss. Owing to the low price of saltpetre, very close working is required to make the business pay, and adulteration is coming much into vogue. The adulteration is practised by the manufacturer, and the saltpetre also meets with sophistication after it leaves his hands. The most glaring adulteration is common salt and alum. The muriate of soda from saltpetre making, is cleansed and mixed in the proportion of 2 cwt. to the ton of petre. In the process of refining the saltpetre, from 2 to 3 cwt. of alum is sometimes used. Nitrate of potash adulterated like this will not of course do for the gunpowder makers, but for many other purposes this adulteration often passes unnoticed.—*Lond. Chem. News*, Nov. 1, 1867.

“MATA.”

By E. S. WAYNE.

This herb, called “mata” by the Mexicans, is in common use in New Mexico, as an addition to tobacco in smoking. A small quantity of it is rubbed to a coarse powder in the palm of the hand, and then mixed with the tobacco, to which, in burning, it imparts a very agreeable odor, and at the same time prevents or corrects the disagreeable odor of stale tobacco smoke upon the clothing, and in apartments.

It was introduced into use here by Major McCrea, U. S. A., and since has become quite in demand by smokers (those who

use the pipe). I have had much difficulty in obtaining any quantity of the article, and then only at an enormous cost. I was fortunate enough this season to obtain a quantity of the seed of the plant, and have been successful in growing a crop, specimens of which are herewith sent, also some of the seed. The plant is rather insignificant in size; the inflorescence is very minute, white, corolla entire, and finely cleft. I have not been able to make out its natural order, or to find a description of it in any work at my disposal. It is not described in the Pacific Railroad Survey (in the botanical section of that Government report).* The odor, when burnt in a pipe, is similar to that of the tonqua bean, and I presume it owes the same to the presence of coumarin in the plant.—*Proc. Amer. Pharm. Assoc.*, 1867.

GIZZARD OF THE SOUTH AMERICAN OSTRICH.

BY E. S. WAYNE.

The inner coat of the gizzard of the ostrich is used in Buenos Ayres in powder, as a remedy for dyspepsia. The specimen herewith sent was presented to me by Mr. T. B. Coffin, who has been for some time past a resident of Buenos Ayres, now of New York, and a member of the firm of C. E. Griswold & Co., manufacturers of feather dusters, and importers of ostrich feathers. The specimen was handed to me with the request that I would make some experiments in relation to its value as a source of pepsin; also as to its value in substance or powder, compared with pepsin, as it was supposed, from the popular belief in the fabulous digestive powers of the ostrich, that a pepsin, or similar substance superior to pepsin, from the stomach of the calf, pig, &c., might be obtained from it. The limited time I have had for experiment has prevented my making any further report at present. I am making comparative tests, the results of which will be given at some future time.—*Ibid.*

* At the request of Professor Wayne I have examined the specimens sent. The seeds consisted of the empty involucre and the achene (with the pappus much broken) of a *Eupatorium*. The dried plant was without flowers, but bears a striking resemblance to some of our Northern species of this genus, and corresponds closely with the description of *Eupatorium incarnatum*, Walter. This species is indigenous to Texas, but is found as far east as Florida and Georgia.

J. M. MAISCH.

ON THE CHEMICAL CONSTITUTION OF FLUORINE COMPOUNDS, AND ON THE ISOLATION OF FLUORINE.

By M. PRAT.

The following is a full abstract of M. Prat's memoir on this subject, recently communicated to the French Academy. The complete paper will not be published until the chemical referees of the Academy have reported on it.

M. Prat considers that chemists have hitherto been mistaken as to the composition of fluorides and the theory of fluorine. He regards the fluorides as in reality oxyfluorides, and the equivalent of fluorine as consequently much higher than is usually supposed. He represents fluoride of calcium by

2 equivalents of calcium,	.	.	.	40.0
1 " oxygen,	.	.	.	8.0
1 " the new fluorine,	.	.	.	29.6
				<hr/>
				77.6

This accords with the known analyses of fluor spar, since it contains 51.5 per cent. of calcium.

By doubling the old equivalent of fluorine (19) we get 38, that is to say nearly the sum of the equivalents of oxygen (8), and of the new fluorine (29.6)=37.6.

According to M. Prat, in order to obtain true fluorine it suffices to heat fluoride of calcium with chlorate, or rather with perchlorate of potash, since it is only after the formation of this latter salt that the reaction takes place. Oxygen is disengaged and also a product which silver absorbs. The compound so formed is fluoride of silver, insoluble in water, soluble in ammonia, from which it is precipitated by nitric acid, and more rapidly altered in the light than chloride of silver. Neither chlorine nor oxygen attack it even at the fusing point of the fluoride. It is, however, decomposed by potash at a dull red heat, and this reaction permits its analysis: it contains—

Silver,	.	.	0.785	.	.	108.0=1 equivalent.
Fluorine,	.	.	0.215	.	.	29.6 " "
						<hr/>
Fluoride of silver,			1.000			137.6

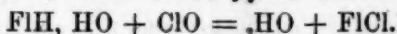
This fluoride of silver, insoluble and very stable, and having

great analogy with the chloride and the other compounds of this family, differs essentially from the soluble fluoride of silver of chemists, which, according to M. Prat, is a compound of—

AgFl, AgO, HO, in the hydrated state;

AgFl, AgO, in the anhydrous state.

Fluorine combines with chlorine. To obtain this compound it is sufficient to pour a weak solution of the hydrofluoric acid of the chemists into a solution of hypochlorous acid: there form



Fluoride of chlorine is gaseous, of a more intense color than chlorine. It converts silver into a mixture of chloride and fluoride.

Fluorine may be isolated, according to M. Prat, by heating fluoride of lead of chemists (1 part) either with nitre (5 parts) or with binoxide of manganese (2 parts); oxygen and fluorine are evolved. A platinum alembic must be used. The oxygen is removed from the mixture by passing over fragments of heated baryta.

Fluorine is gaseous, almost colorless, of a chlorous odor, visibly fuming in the air, incombustible, and heavier than air. It bleaches indigo, and reddens and bleaches litmus. Ammonia produces fumes with fluorine, and will thus detect traces of it. It immediately decomposes water at the ordinary temperature. It combines with hydrogen in diffused light. Fluorine decomposes hydrochloric acid gas, and eliminates bromine and iodine from their compounds. It unites with boron and silicium, and with all metals of the first five groups.—*Lond. Chem. News*, Jan. 10, 1868.

NOTE ON THE PREPARATION OF CRYSTALLIZED PHENIC ACID.

By W. E. BICKERDIKE, F.C.S.

It is seldom that crystallized phenic acid can be obtained by the common process described for its preparation in the text-books; and even when the crude liquid does crystallize, the still fluid portion contains the largest amount of the pure acid.

The following process I find always to give good results:

The impure liquid separated from tar oils in the usual manner by means of soda solution, is first distilled alone, so as to get rid of most of the water and H_2S . It is then re-distilled in a perfectly dry retort with 1 to 2 per cent. of anhydrous cupric sulphate, collecting the distillate in 5 or 6 flasks. Most of the distillate will crystallize at $16^\circ C.$, though it is generally necessary to drop in a fragment of the solid.

If much H_2S is present, it should be removed by boiling, or by leaving the liquid in an open vessel, over night, previous to distilling with the sulphate.

Dalton Square, Lancaster, September 25th.—Lond. Chem. News, Oct. 11, 1867.

ON PLATINIZING METALS.

BY PROF. A. H. CHURCH, M.A., F.C.S.,
Of the Royal Agricultural College, Cirencester.

Let us begin with platinum, one of the least known of the "precious" metals. Precious it is for several reasons. Not that it is very beautiful in color and lustre, for although it may be obtained nearly as white as silver, its appearance usually resembles that of pewter very closely; yet time and experiment have shown that it has most valuable properties. It never tarnishes; no ordinary flame, or fire, or furnace will melt it; most strong acids and many chemical salts do not dissolve or injure it; and, when you do get it to dissolve, its solution forms a most useful chemical test, or "reagent," as it is called. Since the year 1741, when platinum was first brought to Europe, under the name of platina, or "little silver," it has been employed for many different purposes. As it could not be worked like ordinary metals, the Russians, who made coins of it, adopting the plan invented by the English chemist, Wollaston, submitted the powder of platinum, as obtained by the chemical treatment of the ore, to powerful pressure, and to repeated blows, and also to the influence of a very high temperature. By this process the powder or fine particles of the metal may be made to cohere into an uniform solid mass. It is thus that platinum is fashioned into crucibles for chemists, stills for the purification of sulphuric acid, foil, leaf, and wire for various useful purposes. But we really

must not dwell further upon these interesting facts in the history of platinum, for our intention is to describe something newer and less known. We purpose giving the details of a very simple and beautiful process for covering other metals with a delicate film of metallic platinum, and so at once varying their appearance, and endowing them with one of the virtues of this metal, namely, incorrodibility.

We have before mentioned that although platinum does not easily dissolve in acids, it can be induced to dissolve by appropriate treatment. If a few grains of scrap platinum, which may be purchased at the rate of about twenty shillings the ounce, be warmed in a flask with a mixture of three parts of hydrochloric (muriatic) acid and one part of nitric acid (aqua regia), it will soon begin to disappear, dissolving in the acids with a red-brown color, not unlike that of dark sherry. This liquid contains a compound of the metal platinum with the non-metallic element chlorine. This compound is generally called bichloride of platinum. It may be obtained in the solid form by drying up, at a gentle heat, the acid solution of the platinum scrap. This salt, or compound of platinum, may be thus prepared—40 grains of the metal yielding about 68 grains of the bichloride; or it may be purchased at a very moderate price. It cannot, however, be used directly and without any further treatment for the purpose we have in view, namely, the plating (or, rather, platinizing) of various metals. The following directions will serve for the preparation of a suitable solution for this purpose:

Dissolve, in ounce of distilled water, 60 grains of bichloride of platinum and 60 grains of pure honey. Add to the above solution three-quarters of an ounce of spirit of wine, and one-quarter of an ounce of ether. The mixed liquids, if not quite clear, must be filtered through a piece of white blotting paper. The objects to be platinized, which may be of iron, steel, copper, bronze, or brass, are to be thoroughly cleansed by washing them in soda, then in water. When they have been dried, they require heating over a lamp, to a heat below redness. For this purpose they may be suspended, by means of a fine wire, over a spirit or an oil lamp, in such a way as not to touch the flame. Suddenly, before they have had time to cool, the objects are to be completely

plunged beneath the surface of the platinizing liquid. One immersion for a single minute generally suffices; but the process may be repeated if necessary, care being taken to wash and dry the pieces operated upon before re-heating them. The composition of the solution may vary considerably, and yet good results be obtained. Sometimes the addition of more honey improves it; sometimes the proportion of bichloride of platinum may be increased or diminished with advantage. Indeed, it will be found that the appearance of the platinum film deposited upon the objects may be altered by changing the proportion of the bichloride present. The solution may be used several times; gradually, however, it loses all its platinum, the place of this element being taken by the iron or copper dissolved off the immersed objects.

We may now appropriately mention a few examples where this platinizing process seems to furnish desirable results. Articles made of iron or steel—watch-chains, steels, sword-handles, keys, and similar useful or ornamental objects—are greatly improved in appearance, and, moreover, preserved from all chance of rusting, by this treatment. The color of the platinum film is of a neutral greyish black, and it often shows at the same time a faint iridescence. Iron or steel which has been inlaid with gold or silver, forming what is known as damascened work, is greatly improved by platinizing. Neither the gold nor the silver are in the least degree affected, and they will be found to afford a better contrast with the color of the platinized than with that of the original iron. Other artistic applications of this process will readily suggest themselves: coins, medals, chains, and ornaments of brass and copper may be instanced as excellent subjects for experiment. If they have been partially gilt or silvered before treatment with the platinizing liquid, those parts only of the specimen which show the original metal will change in color. In this way very beautiful and effective designs of gold on platinum, or silver on platinum, may be formed, while in the case of gold, at all events, the groundwork metal of copper or brass would scarcely have shown an appreciable contrast of color.—*London Chemist and Druggist*, May 15, 1867, from the *Intellectual Observer* of April.

ON ATTAR OF ROSE.

By DR. R. BAUR OF CONSTANTINOPLE.

Translated and abridged from the *Neues Jahrbuch für pharmacie*, Bd. xxvii, Heft 1. (Januar 1867), by Daniel Hanbury.

Attar of Rose or Rose Oil is the volatile oil obtained on the southern slopes of the Balkan by distilling the flowers of *Rosa damascena*. It is called in Turkish *Güljag* (*Gül*, rose; *jag*, oil).* The word *Attar* the author had never heard used, nor was he able through the help of his Turkish friends to gain any information about it.†

The region in which the distillation of roses for the sake of attar was first commenced is, according to some, India, according to others, Persia or Arabia, while others again refer it to Macedonia or Bulgaria. The author confirms that of which many pharmacologists by profession have long been perfectly aware, that commerce at the present day knows of but one source for attar of rose worth naming, and that is the southern slopes of the Balkan.

The Balkan range extends along the Lower Danube from west to east, forming an imposing chain of vast mountains which in some places project as gently sloping hills into the Tunja valley and in others break off in rocky, impassable declivities. At the foot of one of the highest of these mountains and in the middle of a splendid valley through which flows the Tunja, lies the Bulgarian town of Kizanlik, the inhabitants of which are partly Turks and partly Bulgarians. This is the central point of the trade, and the first market from which proceeds attar of rose to all countries of the world. The extent of country over which the attar-producing villages are scattered is bounded by about 25° and 26° E. long. and 42° and 43° N. lat. The mountain chain which dominates this district consists chiefly of syenite, which by its detritus has produced a soil so fertile as to require

* This, it must be remembered, is the German way of representing the sound of the Turkish name. Mr. Redhouse, the author of a recent Turkish and English Dictionary, writes *ghyül* and *yagh*.

† Yet *Attar* and *Otto* are well known to be equally derived from the Arabic *Ittr* a word signifying *perfume*, *odor*, *scent*; and Attar of Rose is certainly called *Ittr-yaghi* as well as *Ghüyul-yaghi*. D. H.

but little assistance from man. The climate of the district is shown by the vegetation to differ but little from that of the Odenwald or the Black Forest. Wine is produced,—some of it excellent quality,—also silk in rather considerable quantity, etc., etc. The masses of gigantic and noble limes, oaks and chestnuts in the valley of the Tunja are remarkable. In the summer of 1862 the average temperature at noon was 82° Fahr.; in the evening 68°. Barometrical measurements in the same year exhibited a regularly recurring depression at midday of 20 millimetres.

According to some authors, the rose which is used for making attar is *Rosa moschata*, according to others, *R. sempervirens*, *R. centifolia*, *R. provincialis*, or *R. damascena*. The author's opinion is that the original Kizanlik rose, which has been long in cultivation there, is a variety of *R. damascena*, and in this opinion he is supported by Professor Hugo v. Mohl. The Kizanlik rose is not remarkable for beauty, nor is its scent so intense as might perhaps be expected. Other roses, as *R. moschata* and *R. cinnamomea*, yield an essential oil rich in stearoptene, but of a disagreeable odor in comparison with that of the Kizanlik rose. The Kizanlik rose forms a bush of six feet high; its flowers which appear in May and June, are tolerably large, always half double, and stand several on a shoot, but never form a numerous tuft. In color they are bright red, rarely white, and then it is said less productive of attar. The rose is cultivated to form hedges and rarely manured. The odor of the flowers extends for miles.

The flowers upon expansion are collected before sunrise (often with the calyx), and such as are not required for immediate distillation are spread out in cellars, the work being so arranged that the flowers are subjected to distillation the same day they are gathered. Salting and similar processes are never resorted to. The distilling apparatus, which is erected in the neighborhood of some stream, is of simple description, consisting of a fire-place formed of bricks, on which is placed a tinned copper still. The still-head communicates with a refrigerator, which is simply a straight tin pipe passing obliquely through a tub fed with a supply of running water. The product of the distillation is re-

ceived in a long-necked glass flask of the capacity of about $4\frac{1}{2}$ okes (about $1\frac{1}{2}$ gallons). There are usually several such stills together.

All being in readiness and the roses for a day's distilling having been collected, the still is charged with about 10 okes (about 27 lb.) to which is added double their volume of water. The fire having been lighted, distillation is carried on in the usual manner for about an hour and a half, the result being simply very oily rose-water called in Turkish *Gül suju* (*ghyül-suyu*.) The still is then emptied, or rather the exhausted roses are removed from it and thrown away. The decoction which remains and which has a very agreeable rosy smell is used instead of fresh water for a new distillation. The first distillates from each apparatus are united and subjected to distillation by themselves, one-sixth being drawn off; and the residue is used in the place of spring water for other operations. The vessels containing the rose water and completely filled with it are now kept for a day or two at a temperature exceeding at least 59° Fahr., at the end of which time most of the oil, bright and fluid, will have risen to the surface. By means of a very small tin funnel, having a fine opening and provided with a long handle, the oil is skimmed off and is then in condition for sale. The rose water last drawn is of extreme fragrance, is reserved for culinary and medicinal purposes and is much prized. The resin of the calyx, which adheres to the knives and hands of those who cut the flowers, is collected and prized as a perfume under the somewhat inappropriate name of *Gül shamur* (*Rose dirt*.)

As regards the product of volatile oil, it is evidently extremely variable. The author thinks that the average percentage may be given as 0.04, though he cannot support the exactness of his estimate as some who profess to have counted the roses one by one. The annual produce of a harvest is from 300,000 to 400,000 meticals, or in round numbers from 3000 to 4000 pounds, a quantity which represents seven millions of pounds of roses and sets in motion a few thousands of stills. Returns which like that of last season (1866) reach 600,000 meticals are exceptional.

As might be expected with so costly a production, the harvest and its results are dependent on a variety of influences. Of

these the situation of the rose-garden is one of the most important, and it is doubtless the fact that the most productive are those occupying the southern and south-eastern slopes of the range. Plantations lying higher generally yield less attar and that of a quality that congeals more readily.

The nature of the soil has an influence in so far as that when it is poor in humus and but seldom manured, the roses afford but little oil, and that more congealable or, in other words, richer in stearoptene. Currents of air, warmth and light exerts an influence inasmuch as that if the rosebuds develop slowly by reason of cool damp weather, and are not strongly exposed to the solar rays when about to be collected, a rich yield of attar of low solidifying point is the result. But if at the time of gathering or shortly previous, the sky is clear and the temperature high, the quantity produced is diminished and the oil is more easily congealable.* The difference in the congealing point may certainly be taken at 2° R. ($= 4.5^{\circ}$ Fahr.).

The water used for distilling is at first (as stated previously) spring water, and afterwards the waste rose water. The use of hard spring water manifests an influence not only in the quantity but also in the quality of the oil yielded, as compared with that of river water or pure rose water. The author has himself conducted distillations on the Balkan according to the above conditions, on which occasions when the operation was performed with spring water an oil rich in stearoptene, but less transparent and fragrant, was obtained-

As to attar of rose itself, the result of this distillation, the author confines himself in the present paper to that which relates to the production, falsification and examination of the drug, reserving the subject from a chemical point of view for a future communication. Pure attar of rose, carefully distilled, is

* This fact is remarkable. In distilling roses in London I have noticed that it is when the roses have been collected on fine, dry days, that the rose water has most volatile oil floating upon it; when the roses have been gathered in cool, rainy weather, but little or no volatile oil separates. The attar of English roses has an odor by no means very agreeable; it contains a large proportion of stearoptene and does not become fluid at a temperature much below 90° Fahr.—D. H.

at first colorless, but speedily becomes yellowish. Its sp. gr. at 18° R. (72·5° Fahr.) is 0·87; its boiling point 229° C. (444° Fahr.). It consists of an elæoptene and a stearoptene, the former the source of the odor, the latter of the property of congealing into a solid form.

Pure attar of rose, once distilled, solidifies at a temperature of from 11° to 16° C. (51·8° to 60·8° Fahr.) or still higher. It is soluble among other things in absolute alcohol and in acetic acid. Its odor is rose-like with a peculiar honey-like sweetness, agreeable only when highly diluted.* The most usual, and by long practice also the most certain criteria of the purity of attar of rose, are

1. The temperature which it congeals.
2. Its manner of crystallizing.
3. Its odor.

In that which concerns the estimation of attar according to its richness in stearoptene, great caution and attentive observation are requisite. As the stearoptene in a pure state is completely inodorous, an examination as to its presence is properly of no real value, for the less congealable the oil (*i. e.* the freer from stearoptene), the stronger and more agreeable in its odor. Attar of rose is used only as a perfume; moreover it contains a body which being itself devoid of odor, weakens the intensity of the odorous principle, thus diminishing (taking an economical view) the value of the attar as a perfume. But it is not so judged in commerce. In Kizanlik, as at all other places, attar is up to the present time bought and sold chiefly according to the temperature at which it solidifies,—in other words according to the proportion which it contains of *inodorous camphor* or *attar-of-rose-stearoptene*. Why is this? The answer is simple. The stearoptene is to a certain extent one of the constant constituents of attar of rose, and an indicator of its purity. If rose-oil be augmented by fraudulent additions, its congealing point will be thereby diminished, and it will be necessary to increase its crystallizing tendency by the addition of some substance possessing properties like those of the natural stearoptene. But

* This is entirely a matter of taste. To many persons the odor of the undiluted attar is extremely delicious.—D. H.

any such body which is not at once recognizable even by a person of small experience does not (to the author's knowledge) exist.

Almost the only substance at present known with which rose-oil-stearoptene can be replaced, or in other words which can be employed to conceal the addition of another essential oil and consequent reduced proportion of stearoptene, is *spermaceti*. This, however, effects the purpose in but a clumsy manner, for it soon separates, settling down as a solid cake, and forming none of the long, light, peculiar crystals which characterize the true stearoptene. It also exhibits, upon shaking, a peculiar iridescent, muddy looking appearance [*irisirende Schlierenbildung*]. The crystals [when separated] melt at 122° Fahr. and leave on paper a strong stain of grease. If a sample of attar, suspected to be adulterated with spermaceti, is placed when near the temperature of congelation in a centrifugal machine, the spermaceti if present, will in a few minutes be driven to the bottom of the bottle in which the sample is contained: this adulteration is thus easily recognized. Pure rose-oil-stearoptene fuses at 33° C. (91.4° Fahr.), volatilizes completely from paper on careful warming, is specifically lighter than the elæoptene and much lighter than spermaceti. It is inactive to polarized light.

Other adulterations, as for instance with margaric acid, are difficult. Although the substitution of other substances for the true stearoptene is easily detected, the author has had occasion in many instances to suspect adulteration, and often when the *corpus delicti* has been regarded by connoisseurs and chemists as unquestionably spermaceti, he has proved it, on closer examination, to be merely the stearoptene of the attar.

If the admixture of spermaceti is proved, there is still the question of adulteration with essential oil, and this is in fact much more frequent, and alas! of much more difficult recognition.

The admixture in question relates entirely to the so-called Geranium- or Palmarosa-Oil. That oil of rhodium and oil of sandalwood are mixed with attar, as stated in many handbooks of *Materia Medica*, or that such a mixture can be substituted for pure rose-oil is for any person who has once in his life smelt

these oils, simply an impossibility.* It is equally erroneous to suppose that the true ethereal oil of a geranium (as that of *Pelargonium odoratissimum*) is used for mixing with attar, and this is certainly not the plant whence the so-called *Oil of Geranium* used in turkey is derived.†

The Turkish Geranium oil (in Turkish called *enterschah†*) is according to the most credible accounts, derived from a grass of the genus *Andropogon*, from which it is distilled in the months of December and January in the neighborhood of Delhi. It comes to Turkey by way of Arabia, and is sold here by Arabs in large bladder-shaped vessels of tinned copper holding about 120 lb. each. When recent it is tolerably limpid, bright yellow to brownish, oftentimes colored green through containing copper, and very frequently,—indeed mostly,—contaminated by the addition of a fatty oil. In purchasing care must be taken to avoid that which contains much fixed oil, or which is mixed with some other essential oil. An experienced nose and a bit of cigarette paper are all the re-agents requisite for determining these additions.

The Geranium oil as it arrives is, however, by no means in a proper condition for mixing with attar. Its odor and color must as far as possible be assimilated to those of rose oil, and to this end it has to be refined. By this process it loses its penetrating after-smell, and according to the goodness of the sample treated, acquires sooner or later a pale, clear yellow color. It also loses the property which it possesses in the unrefined state, of acquiring a red color (separation of Cu_2O) upon long standing. The purifying process is thus conducted: the crude oil is shaken repeatedly with water acidulated with lemon juice, from

* The complete disappearance from commerce of true Rhodium Wood, is a sufficient reason why the essential oil which it contains is never now used for the adulteration of attar of rose.—D. H.

† This is perfectly correct. True Geranium Oil distilled in the neighborhood of Cannes from a variety of *Pelargonium Radula* Ait. is very distinct from the so-called Geranium oil of Turkey and of India, which are undoubtedly yielded by a grass of the genus *Andropogon*.—D. H.

‡ Is this a corruption of *Itri shahi*, a name applied, according to Red-house's Dictionary, to the "*scented-leaved geranium*," as well as to the *Sweet Pea*?—D. H.

which it is poured off after standing one day. The washed oil is then placed in shallow saucers exposed as much as possible to the sun and air, whereby it gradually loses its objectionable odor. The spring and early summer are the seasons most suitable for this operation, the period required for it varying, according to the quality of the oil and the weather, from two to four weeks. Artificial bleaching agents could doubtless be used for depriving the oil of its color, but not for refining its odor. Those who have tried them have always returned to the old method of exposure to solar light; and though the resources of art may not have been exhausted, they have certainly not yet been successfully applied for the improvement of this oil.

Refined Geranium oil constitutes a bright yellow, somewhat viscid liquid, of an odor remotely suggestive of roses, and not over-strong; its sp. gr. varies according to the degree of insolation (resinification) from 0.88 to 0.92. When the oil is good and the refining process has been well conducted, a considerably larger quantity may be added to the attar without diminishing its disposition to congeal than when the oil is of inferior quality. To this the consistence or sp. gr. of an oil chiefly contributes, for the more geranium oil accords in sp. gr. with the attar with which it is mixed, the more fully does the latter retain its own peculiar qualities. If geranium oil be re-distilled, whereby it is rendered lighter, or if with the bleached oil, resin etc. is mixed so as to make it heavier and more viscid, the congealing power of attar with which either of such oils is mixed, is impaired. Geranium oil does not solidify at -20° C. (-4° Fahr.), but becomes at that temperature turbid and thick. Like attar, it takes up ozone from the air and shows an energetic reaction with iodine; it is easily soluble in ordinary spirit of wine, and affords like attar a well-crystallized compound with Ca Cl. It is quite inactive to a ray of polarized light.

Geranium oil is mixed with attar in almost any proportion, from a few parts per cent. up to 80 or 90. The differences in congealing point are not quite in proportion to the relative volumes of the two oils which are mixed, apart from the variable properties of each; and to calculate the amount of mixture that is required to suit a particular market, one has always to

make some preliminary trials as to the congealing point. Thus it will be seen that the business of adulterating attar is somewhat troublesome, but honest dealing out of the question, it is very profitable.

Many attempts have been made to discover some chemical reaction which would reveal the falsification of attar with geranium oil, but hitherto mostly in vain. As completely deceptive may be noticed Guibourt's test with the vapor of iodine; and also that with KI and starch. The author has had the opportunity of preparing a standard attar of rose on the spot and was also in a position, such as scarcely another chemist ever was, for investigating the whole subject. Pure attar gives with iodine and with iodide of potassium and starch the same reactions as when it is mixed with geranium oil, and even those with pure geranium oil are hardly different. The proposed test of NO_2 , NO , and SO_2 are equally devoid of value.

Among reactions such as these there is not one of real importance for the recognition and determination of geranium oil when mixed with attar. The author has learnt to distinguish but one constant character for geranium oil, which is that of not diverting a ray of polarized light; whilst attar in a tube of 100 mm. rotates the ray 4° to the right. Here is the single handle for the examination of a suspected attar. Considerable difficulties are certainly in the way of using such a test. The differences observable are very small, and the test is in fact applicable only in the case of very gross adulteration. In the use of a longer tube (say about 200 mm.) there are difficulties from the color of the oil and its want of transparency. The author has recently made trials of another form of polarizing apparatus constructed expressly for the purpose, which has enabled him to detect in attar of rose so small an addition of geranium oil as 5 per cent.; but such an apparatus is somewhat expensive, and much practice is required in order to use it effectively.*

* The difficulties of employing polarized light for the discrimination of attar are, in my opinion, too considerable for the test to be at present of any practical value. I may refer to some experiments on the subject made in 1857 by my friend Dr. De Vry, the results of which by no means accord with those obtained by Dr. Baur.—D. H.

The author considers that an attar of rose which at a temperature of 12.5°C . (54.5°Fahr.) in a thin glass tube does not congeal well in the space of five minutes, and which has not moreover a dextrogyre rotatory power of 4° , should be returned to the seller, no matter how fine may be its odor. That there are attars which solidify at 10°C . (50°Fahr.) and yet are genuine (owing, for instance, to faultily conducted or to repeated distillation) is just as true as that there are those which do the same at 20° to 25°C . (68° to 77°Fahr.) and are yet of indubitable goodness. But these are exceptional, as in the case of opium, certain indubitable pure samples of which have yielded respectively 2 and 16 per cent. of morphia.

To obtain attar of rose as far as possible free from adulteration, the author recommends that purchasers should address themselves to well-known and respectable firms, who possess whatever facilities exist for obtaining a genuine product; yet with all this, no firm would probably be willing to give an absolute guarantee in respect to such an article.*

There is still one other kind of adulteration, though it has actually no importance and is only mentioned here for the sake of completeness. It is the addition of alcohol. Attar of rose, as such, does not dissolve in alcohol of 85 per cent. (sp. gr. .835) or rather the elæoptene dissolves while the stearoptene separates. On mixing the two liquids one obtains a magma of little crystals. On the other hand it dissolves readily in absolute alcohol which might well be used for the purpose of adulteration, were not its odor immediately perceptible even to the uninitiated. For such a falsification, which, however, I never knew to occur in commerce, a salt of rosaniline may, according to Puscher, be em-

* To this excellent recommendation should be added another, namely, that purchasers should be willing to pay a remunerative price for a good drug. Some years ago a quantity of attar of rose was consigned to a house in London, with directions that it should not be sold unless at a certain high price, but that if no purchaser could be found for it, a certain proportion (20 or 30 per cent. I believe) of another essential oil which accompanied it should be mixed with it, and that it should then be offered for sale as best attar. I remember the circumstance and had samples of each of the essential oils: that which was to be used for diluting the attar was the so-called Geranium Oil.—D. H.

ployed as a test.* The addition of acetic acid or of fatty oil is of course of easy recognition.

The test of odor has been already mentioned. Of this criterion it is impossible to write, as it is an affair of much unprejudiced experience,—impossible without standard specimens for comparison, but with them often decisive. Dilution of the essential oil with an absolutely inodorous substance, as pure sugar of milk, affords a means for detecting more easily an after-smell (*Biegeruch*). One must also regard a certain sweetness which is quite foreign to the odor of geranium oil.

Attar of rose is exported in bottles,† or when required in large quantities, in what are called *cuncumas*, that is to say flat flasks of tinned copper, having a short and narrow neck. These vary in capacity from 1 to 10 pounds; they are sewed up in white cloth either at Kizanlik or, when necessary, at Constantinople, sealed, and provided with the Custom House ticket.

Among the bottles must be mentioned the long, angular little

* The test here referred to depends on the solubility of a salt of rosaniline (as the oxalate which is known as *Fuchsin*) in alcohol and comparative insolubility in an essential oil. If an essential oil contains even so little as one per cent. of alcohol, the admixture, it is stated, will be detected by the pink color produced on shaking the oil, with a few particles of the rosaniline salt. I have tried the test on the oils of lemon, lavender, anise, nutmeg, carraway, juniper, peppermint and rosemary, and have found them to acquire only a faint pink color. The Ceylon grass-oil called *Citronella* became deep pink, as did the Turkish so-called *Geranium Oil*. Another grass-oil, that of *Verbena*, a sample of which, distilled by Mr. Fisher of Singapore, I regard as of indubitable purity, was scarcely colored by the test. Two samples of good commercial Turkish attar became of a bright pink when the rosaniline salt was shaken with them. Rose Oil collected from English rose-water was entirely unaffected, as was a sample distilled at Grasse; another sample obtained from a manufacturer at Cannes acquired a considerable color when treated with the test. From the few experiments here detailed, I conclude that oxalate of rosaniline may possibly be a test for the purity of attar of rose, indicating, by the color produced, either the admixture of alcohol or of geranium oil. But experiments should be made on a standard sample of Turkish Rose Oil, which unfortunately I do not possess.—D. H.

† The cut and gilded glass bottles in which attar is so often imported are said to be of German manufacture.—D. H.

vials, usually of minute capacity, which travellers bring home as presents after a journey in the East. They hold perhaps about fifteen drops of oil, are tied over with bladder and red silk, and, what invests them with most value, are sold in the bazaar to the unwitting traveller at a high price. They often contain simply a few drops of geranium oil, the bladder being smeared with a touch of attar.

Having detailed the history of rose-oil from its distillation to its transport into commerce, but little further need be said. Although, as has been shown, it is the Balkin that produces the attar of commerce, a small exception must be made in favor of the districts of Grasse and Nice in Southern France and of Algeria, where also attar is distilled. But the quantity there produced is so small and the oil of far higher congealing point, and on that account of much less powerful odor, that it is vastly inferior to the oriental attar, and is mentioned in this place only as a curiosity. What has been written about the production of rose-oil at Brussa is simply untrue. At Adrianople even rose-distillation is no longer attempted.—*Lon. Pharm. Jour.*, Dec. 1867.

NOTE ON A NEW KIND OF KAMALA.

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Kamala is the name of the small glands which densely cover the tricoccous fruit of *Mallotus philippinensis*, Müller Argov. (De Candolle, 'Prodromus,' xv. 980), formerly known as *Rottlera tinctoria*, Roxburgh, and are simply brushed off from the ripe capsules. The same glands occur also in the thin tomentum of the under side of the leaves, and even on all parts of the male spike of the shrub; but in the latter place they are so little numerous and so scattered, that they are scarcely seen without the magnifying glass. All these glands are of an irregular spheroidal shape, but depressed and somewhat flattened on that side where they are fixed upon the capsules or leaves, while the opposite side is more regularly domed. If they are

caused to roll under water or glycerine, the glands all ultimately show to the observer their flat side. In its centre we find a very short stalk-cell, from which a certain number of small clavate cells radiate in different directions, thus constituting the somewhat globular form of the gland, which is covered by a weak integument. The thicker ends of the small clavate cells within, appear at the outside as soft protuberances, upon which partly depends the irregularity of the nearly globular form of the glands. The radiate cells in question are arranged around the centre of the flat side to the number of from 9 to 30. If only the basal side is examined, they will be seen to be filled with a dark brown or brownish-red resin, the intermediate spaces and the outer membrane being of a light yellow color. The outline of that side, which is always turned to the observer, forms thus an undulated circle or ellipsis, the diameter of which varies from 70 to 120 micromillimetres (thousandth parts of a millimetre),—the height of the whole gland being always considerably less.

The kamala glands are always accompanied by a tolerable amount of characteristics, stellate, colorless or brownish hairs, belonging equally to the fruits of *Mallotus*, and some fragments of the latter and inorganic purities.

I had the opportunity for examining authentic specimens of the above plant from the Calcutta gardens, from which I am indebted to my friend Hanbury, and several others received from the late Mr. Zollinger, under the name *Rottlera affinis*, Hasskarl, *β. sumatrana*, a species now united with *Mallotus philippinensis* by the recent author of the *Euphorbiaceæ* in the 'Prodromus.' The glands of these plants I find to be certainly identical with commercial kamala, as hitherto furnished by English as well as by continental importers, and the mother plant must certainly be, as generally supposed, the said *Mallotus* or *Rottlera*.

The resins contained in kamala, to the amount of 78 per cent. have been examined, in 1855, by Anderson,* who stated, at the same time, that 3·8 per cent. of the weight of kamala are due to inorganic matters. I must confess that I never met with the

* Edinburgh New Phil. Journ. vol. i. p. 330; Pharm. Journ. and Transactions, vol. xvii. p. 407.

drug of so great purity; all my samples yield at least three times that amount of ash. But for a long time past the kamala we have had on the Continent has been of bad quality, containing more than half its weight of sand and sesquioxide of iron.

Students of *Materia Medica* being indebted to my friend Mr. Daniel Hanbury for some information about this valuable drug, I lately applied for a specimen to that gentleman, who presented me with an evidently fine sample, which recommended itself by a dark red and somewhat violet color, and being not dense. The color indeed is different from the brick-red hue we are accustomed to see in kamala as found hitherto in Europe, and the microscopic examination affords full evidence that this newly imported drug cannot be furnished by the same plant, although it may belong to one closely allied.

The general structure of the new kamala is the same as that of the common kind,—that is to say, it is formed of small resin-cells covered by a light yellow membrane. But their form is not globular; the glands are rather of cylindrical, or often nearly conical shape, so that they shew, when seen under the microscope, the outlines of an elliptical or ovoid figure, and not a circle. Their longer diameter is of 170 to 200 micromillimetres, the shorter from 70 to 100. The smallest glands of the new sort are as large as the majority of those of the true kamala. Even that side of the former, by which they were fixed upon the fruit, is but a little flat, and only perceptible when the glands are allowed to swim or roll in a liquid. It is this side only which shows small resin-cells radiating from its centre, as in the common glands of *Rottlera*; but besides these, the whole arrangement of the other small cells is thoroughly different, and they are not of a clavate but of a simply subcylindrical form. The structure of the glands of the new drug may be explained by stating that they are divided into four or five transverse sections or stages, each of which contains a series of perhaps twenty small resin-cells, arranged in a parallel vertical order, very dissimilar from the radiate arrangement seen in common kamala, as will be distinctly observed if the drug is previously exhausted by alcohol or ether, and then crushed under glass, or completely washed by weak spirit and then examined under water. The

empty resin-cells are ruptured at the boiling-point; the observer can count five, seven or ten of them in each of the three, four or five ranges or transverse divisions of the gland, if he adjusts the microscope exactly so that only the upper side of the gland occupies the field. The point of insertion of the gland is marked, though but rarely, in the very centre of the base, by a very small stalk-cell. The formation of common kamala has been well explained by Dr. Vogl, of Vienna, as occasioned by a successive *perpendicular* division of a mother cell; here we have a *transverse* horizontal division. There can be no doubt that the kamala in question must belong to another plant than *Mallotus philippinensis*, and I am glad to state that Dr. Müller (Argoviensis), the learned author of the *Euphorbiaceæ* in De Candolle's 'Prodromus,' is of the same opinion. In the genus *Mallotus* (formerly *Rottlera*) there are some other species besides *M. philippinensis* which bear colored fruit,—as for instance, *M. atrovirens*, *M. japonicus*, *M. Albus*, *M. oreophilus*, *M. ricinoides*; further researches are needful to make out to which of them our new drug may belong, if indeed it belongs to any one of them. Besides its peculiar form, structure, and dimensions, I have observed, moreover, that the new kamala is mixed with nearly colorless hairs, but that they are quite simple, not stellate or tufted as in common kamala. I will not mention other accidental fragments of the plant which accompany the glands; they may become of comparative utility in the determination of the plant from which the drug is derived.

Another fact of some interest is the curious behaviour of the new kamala at the temperature of 200° to 212° Fahr., when it takes an intense *black* color, losing only 5·6 per cent. of water. I presumed that this strange change might be due to the presence of an acid body, like a sulphate or sulphuric acid, but none such was found. Common kamala does not undergo any apparent alteration at the said temperature. The structure of the blackened kamala remains the same; it furnishes also the same tincture with spirit or alkaline liquids. The resins removed by alcohol, amount to 71·8 per cent. of the dried substance; the inorganic bodies (ash) to 12·9 per cent.

The alcoholic tincture, if allowed to evaporate very slowly,

leaves microscopic crystals, which I suppose to be Anderson's *Rottlerine*; this sort of kamala seems to be well suited to furnish that interesting principle.

[*Note by Mr. Daniel Hanbury.*] In accordance with a suggestion of my friend Dr. Flückiger I have set on foot some inquiries as to the origin of the new kamala described in the foregoing paper.

Dr. Flückiger has so carefully described the characters of the drug that there is but little which I can add. I may, however, point out that the new kamala has a distinct odor, which is exactly that which is perceptible when a *tincture* of the old sort is poured into water. Apart from its dissimilar structure when seen under the microscope, the new kamala differs most obviously from the old in its darker color, larger grains and freedom from earthy impurities.—*London Pharm. Jour.*, Dec. 1867.

TAMPICO JALAP.

By CHARLES UMNEY, F.C.S.

The attention of the pharmacist has recently been directed, in the various journals of pharmacy in this country, to a variety of jalap, rather abundant at the present time in the drug market, known as Tampico jalap; comparison has also been made between it and the officinal jalap (*Exogonium purga*) known commercially as Vera Cruz.

In a paper read at the Pharmaceutical Conference this year (*Pharm. Journ.*, October, 1867), Mr. A. Southall gave the result of analysis of several samples of jalap of both varieties, the product of resin amounting, in some cases, to 33 per cent.

Messrs. T. and H. Smith remark (*Pharm. Jour.*, November, 1867), that they have never succeeded in obtaining more than 15 per cent. of pure resin from any kind of jalap, neither have they ever seen a greater yield recorded.

They account for the discrepancy between their statements and that of Mr. Southall, by saying, that the resin as obtained by him could not have been in a state of purity and dryness. So far they are correct, but they have underrated the maximum yield of resin of jalap.

M. Guibourt, twenty-five years ago (Pharm. Jour., vol. ii., 336) recorded 17.65 per cent. of pure resin, obtained from an ordinary specimen of officinal jalap.

Having a quantity (56 lbs.) of fine selected Vera Cruz jalap in process for the production of resin when I saw their letter in the Journal, I determined to note accurately the quantity of resin, free from matter soluble in water, and in a dry and pulverulent state; this was $21\frac{1}{2}$ per cent., or $6\frac{1}{2}$ per cent. more than the maximum found by Mr. Smith.

Tampico jalap of the finest quality has not given me the fortunate results of Mr. Southall, for I have never obtained more than from 12 to 15 per cent. of resin; nevertheless, by selecting very heavy pieces, probably 2 or 3 per cent. more might be obtained.

It is quite possible to obtain 33 per cent. of alcoholic extractive, even when in a dry state; but this extractive is not wholly resin, for from it there can be easily separated, by means of water, 15 per cent. of saccharine matter, and the greater part in the state of grape sugar. This, doubtless, has been Mr. Southall's source of error; he has evidently taken the alcoholic extractive as pure resin, whereas the half is nothing more than sugar. This saccharine matter exists in the officinal jalap, but in a somewhat different proportion; four selected tubercles (very heavy) gave $20\frac{1}{2}$ per cent. of pure dry resin, associated with which, in the alcoholic extractive, was $9\frac{1}{4}$ per cent. of sugar. The sum of these two very nearly coincides with the 30 per cent. of Mr. Southall, as obtained by him from the Vera Cruz variety.

Thinking it likely that *resina jalapæ* was to be met with in an impure state in pharmacy, four samples were obtained in town from first-class sources (wholesale and retail); these upon examination proved that the suspicion was not unfounded.

No 1. Resinous. Translucent at edges. Brittle. Made from Vera Cruz.

" 2. " " " " " "

" 3. " " " 15 p. c. moisture. " "

4. { 78 p. c. resin, } Very opaque. 7 p. c. moisture. Tampico.
 { 15 p. c. sugar, }

This substitution of Tampico for Vera Cruz jalap has doubtless been caused by the praise lately bestowed upon the former.

I cannot agree with Mr. Southall that both jalaps and their respective resins are equally active, inasmuch as the resin in Tampico jalap is present invariably in much smaller quantity, and is chemically different from the true resin of jalap, for it is almost wholly soluble in ether, whereas in the other only 12 per cent. is dissolved. This soluble portion is known as jalapic acid, the insoluble as jalapin* (this test affords a ready means of distinguishing it from other resins, such as guaiacum, scammony, etc.). Jalapin is known to the chemist as rhodeoretin, from the rose-red color produced by the action of oil of vitrol upon it, and in this reaction it is resembled by the Tampico resin, which seem similar to that obtained from the *Ipomœa orizabensis*, the male, fusiform, or stalky jalap of Guibourt, whose resins from this reaction was named para-rhodeoretin.

In odor, Tampico jalap much resembles peat fuel,—peat probably is used in the drying of the root; this peculiar smell is very characteristic; it clings to it even after it has been dried in a stove for a considerable time; in its powder it is easily recognized, and even its extract and resin retain the odor to a slight extent; but it is not impossible that this peculiarity is due to volatile oil, as a species of the Order *Convolvulaceæ* yields a volatile oil (*Rhodoriza*).

Since making the above experiments, Mr. D. Hanbury has kindly lent me a paper entitled, "Etude sur les Convolvulacées Purgatives," by M. Ambroise Andouard. The author states, that Tampico jalap is that described by the late M. Guibourt as "jalap digité majeur; analyses of some specimens indicate 5 per cent., the finest examined yielded 14 per cent. He fully coincides with the opinions of Guibourt, who says that Tampico jalap should not be used in the preparation of medicines, in which jalap is a constituent. He (the author) does not think that this jalap should be even classed with the false jalaps, such as the male or fusiform jalap, or the rose odor jalap. The resin he states is purgative, for he himself has tested its efficacy in a few cases; his opinions are also confirmed by other experi-

* A large proportion of jalapin used in this country is supplied by the German market,—and is nothing more than the decolorized resin of either Tampico or the fusiform or male jalap.

menters; but he considers this jalap as an inferior kind. In concluding his essay, M. Andouard says, that the jalaps of pharmacy are reduced to two,—the tuberos and the fusiform; the Tampico is an inferior kind, and should only be used in the state of resin; and that it is necessary for the pharmacist to know when to use the one and the other.

Pharmacologists cannot agree as to the plant that yields this variety. Guibourt queried whether it was not the *Ipomæa mestitlanica*, which, according to Choisy, is a Mexican product, known as "purga." This however is doubtful.

The majority of pharmacists, I am persuaded, will not think themselves warranted, but will decide that it is improper, to substitute in any preparation the Tampico for the true jalap, which has been so highly esteemed for more than two centuries, and whose efficacy and certainty of action is beyond the slightest doubt.

40, Aldersgate Street, E.C.

Lon. Pharm. Jour., Dec. 1867.

LOFODEN NORWEGIAN COD-LIVER OIL.

BY ROBERT HOWDEN.

The information in this paper relating to Lofoden cod-liver oil is supplied on the authority of four gentlemen in Norway,—Captain H. Olsen, of the Royal Navy, Commanding Officer of the Government Surveillance at Lofoden; Captain Heyerdahl, of the Royal Navy, engaged on the same station; Mr. Möller, a pharmacist, of Christiania, who has devoted many years of a long life to the subject, and Mr. Sharp, an English merchant at Christiania. To the latter gentleman, my friend Mr. Sharp, I am under particular obligation, for he not only translated a series of questions prepared for the purpose into the Norwegian language, but placed himself in direct communication with those gentlemen whom he considered, by their official position or personal experience, able to supply accurate and intelligent information. He further translated their replies into English, thereby furnishing the basis of the present communication.

Every year, early in the month of January, the cod-fish begin their great migration from the deep sea. Moving in a north-easterly direction, they approach the coast of Norway and concentrate themselves upon the Lofoden Islands, entering the estuaries by the Westfjord. These islands are situated near the northern extremity of Norway, about 150 miles within the Arctic Circle. The Westfjord is a sheltered bay extending for thirty miles between the islands and the continent.

The cause of this great migration of the cod is probably due to the instinct of propagation. The roe is specifically lighter than sea-water and floats upon it, hence the fish seek those shallow and more quiet waters where their ova may be securely hatched, protected equally from the strong northerly winds of the glacial regions and from the impetuous currents and waves of the Atlantic by the lofty wind-guards and natural breakwaters they find in the Lofoden Islands. In this favorable locality, after the roe is hatched, they leave their young fry.

Immediately on the appearance of the immense shoals of cod at Lofoden, a remarkable result ensues,—all other kinds of fish disappear with one consent. The exact cause of this curious phenomenon is not yet understood, but literally it is the fact that the very herrings used as bait can no longer be taken in those waters, but have to be imported from a distance, and are sold to the fishermen as articles of trade. Two important consequences attend this singular circumstance; one, that the fecundated roe, secure from the predatory attacks of many voracious enemies, has a favorable opportunity for development, whereby a large supply of this valuable fish is maintained; the second, that no other fish than cod can be taken in the nets, and consequently, no other livers than those of the cod can be employed in the preparation of the oil.

As soon as the cod are known to have arrived, the fishing begins without delay. But during the month of January, the results are neither large nor important, as those engaged at first are only agricultural laborers and peasants living near the coasts. Fisherman by vocation, many of whom come from considerable distances, begin to arrive towards the end of the month, when the great fishing commences; the exact date slightly varies in

different years, but it may be approximately given as the first week in February. The total number of men then assembled is estimated at 25,000. The quantities of cod are prodigious, their numbers incalculable; a good or a bad season does not depend on the variable supply of fish,—that is apparently always the same, and beyond computation,—but upon the weather, as every rough day prevents the open boats putting out to sea, occasions a serious loss to the whole fishery.

Three different methods are employed in the capture of the cod; the deep line, the long line and nets. When caught in nets, the fish are, with few exceptions, dead on being drawn out of the water; this is generally the case also with the long line, especially if stormy weather has delayed the fishermen in taking it up; with the deep line the fish are all secured alive. They are never killed, but left to die of themselves, which they do during their transit to the shore; so that a catch of fish is always brought on land dead, by whatever method it may have been taken.

In Lofoden, the common and almost only bait is the herring, *Clupea harengus*; as herrings must be purchased, it sometimes happens that worms, mussels, or the cod-roe are employed. The fisherman who are obliged to use these obtain far less fish than those who can afford herrings, as the cod being assembled for the purpose of breeding, are not very much inclined to feed. The best bait of all, and the favorite food of the cod, is the capelin; but by a very old Norwegian law, made long before the principles of commercial liberty were understood and practiced, its use is prohibited at Lofoden because being obtained with difficulty, and only by few persons, the fortunate fishermen who had any, not only caught fish as fast as they could take them from the water, but gave the cod a disgust for all other kinds of bait, to the prejudice of their indignant neighbors.

Every afternoon, at a given signal from the surveillance, those fishermen having nets or long lines, row out one or two sea miles to their fishing-grounds, set their tackle, then row back and pass the night on shore. Next morning, the signal being again given, they all row as before, take their catch and return with it during the forenoon. The fishermen with deep lines remain all day at sea,

leaving very early and returning in the evening; the distance these have to row is from four to seven English miles.

As soon as the fishermen has come to shore, he proceeds to cut the head off every fish and takes out the roe and liver, thus distributing his catch into four groups. The fish is sold on the spot to purchasers or dealers, who are there for the purpose, or else the fisherman hangs it up to dry for himself, and later in the season, removes with it to the "stœvnetid," the home-time, meeting-time at Bergen. The roe he usually salts immediately.

The livers are disposed of in the following manner:—some he throws at once into large wooden vessels, holding from eight to twelve hogsheads, and, by frequent agitation and stirring with wooden beaters, obtains from them, at the ordinary temperature, a fine transparent oil, which floats on the surface. This oil is drawn off and preserved separately. The livers thus partially exhausted are then either secured in barrels for the further purpose of oil burning at home, or else, being left in the open wooded vessels, suffer decomposition; the oil produced becomes gradually darker, bubbles multiply, gaseous products are freely disengaged, accompanied with an exceedingly unpleasant, penetrating smell that may be perceived at a great distance. The livers that are not thus treated, the fishermen pack into barrels bought for the purpose. Day by day the livers produced by the day's fishing are put into a barrel until it is quite full; it is then bunged and a new barrel begun. When the fishing is ended, every one takes the number of barrels belonging to him and journeys homeward. The best livers and the finest oil are taken from those fish that have just arrived from the deep sea, the cod is then fattest and in best condition; but by remaining in shallow water, where the function of spawning is accomplished, where feeding is not its object, and where little food is to be obtained, it becomes leaner and leaner, until, on its return to the deep sea, it is quite emaciated.

Cod-fishing at Lofoden terminates on the 14th of April. All the contracts for service expire on that day, according to ancient custom; even though the fishing may be productive with a prospect of continuous good results, the men disperse notwithstanding, and their labors are discontinued. The reverence

that the northern races have for the festival of Easter is the original cause for this usage, together with the ardent desire felt by every individual to pass the holidays following that religious anniversary, preceding as they do the joyful spring time and much-longed-for summer, in his own home. Quite recently some employers have tried to make contracts with their men to continue the fishing beyond the 14th of April, if fish were abundant; this, however, is at present an exceptional stipulation and by no means the custom.

On arriving at their several huts and villages the preparation of the oil is proceeded with, and generally completed by the end of May. While the barrels of liver remain at Lofoden, and still more during the journey afterwards, much of the cellular tissues becomes disintegrated, and the oil flows out; so soon as the barrels are opened, the oil is carefully poured off and kept apart, and this, together with that made at Lofoden in the open wooden vessels, is the *light yellow oil*. The livers having been partially exhausted are then thrown into iron kettles hung over an open fire, the water contained by the livers being allowed to evaporate; the oil is poured off as fast as it becomes disengaged by the warmth, and is put into barrels. This is *brown oil*. Increased heat above 212° Fahr. is now applied, so that drops of rain, (for the operation is always carried on in the open air,) falling into the kettle are instantly converted into steam with a slight explosion; the color deepens; as the temperature increases the oil gradually grows darker, till at last, when what remains of the livers floats about as hard dark lumps in oil that is almost black, the process is considered to be finished, and the remaining product is the *dark tanner's oil*.

In Sweden, Denmark, and even in Norway itself, as well as in other places, there is a prejudice in favor of the brown oil. It is regarded by many as superior in its remedial properties to the light yellow oil. But as the light yellow oil is an exudation at a low temperature from the liver at its freshest period, and has certainly less flavor and odor than any other kind, it does not appear that this preference is well founded.

It is apparent that a variable and sometimes long interval takes place between the removal of the liver from the fish and

the separation of the oil. Livers taken in January may not be treated for their oil till April, and even if taken at the end of the season the interval may be considerable, depending upon the distance of the fisherman's home, on Easter-tide, and also upon the supply of kettles, for few fishermen own these utensils, but borrow of one another. When the boiling is begun, no difference is made between livers taken early or late, but all are treated alike. Thus the first livers that may be presumed to be the best will be the stalest, and the late and poor livers the freshest. The average time that elapses between the death of the fish and the separation of much of the oil, may be said to be from one and a half to four months.

Oil is never sold at Lofoden during the fishing season, but in May and June the fishers take their several products to Bergen, which is the true market. They are unwilling to sell their livers on the fishing-grounds, though at advancing prices, preferring to make the oil themselves, even with less ultimate profit. The reason is peculiar; they are to a man desirous of being present at the great annual gathering at Bergen, for to be frequently absent from it lowers their reputation at home as men of the world; so a regard for their personal importance, together with the pleasures of social reunions, and the excitement of competitive trade are too great temptations for their natural prudence and thrift to resist. At Bergen, before the oil passes into the merchant's hands, it is classified, by brokers appointed by government, into three qualities, known as the light yellow, light brown, and brown. The average price of the light brown oil is from three shillings to three shillings and sixpence per gallon.

Although many of these particulars relate to the fisheries at Lofoden, it is proper to be understood that cod-fish are taken along the whole coast of Norway all the year round, and especially on the coast of Finmark during the months of April and May, when the Lofoden fishing is over. But in all these cases the cod are no longer alone; with them are many cognate and other species, who move all together in pursuit of common prey, or pursued by common enemies. Among these are herrings of several varieties, the capelin *Mallotus arcticus*, inferior sorts of cod, as *Gadus merlangus*, and many other small fish. At Fin-

mark the *Gadus morrhua* and the *Gadus virens* arrive in about equal quantities, and of course are caught in the same nets. The *Gadus Carbonarius*, or coal-fish, also associate with the cod in great numbers, and are captured with them, as well as *Gadus molva* and *Gadus aeglefinus*. In pursuit of these, and taken with them, are *Scymnus borealis*, *Squalus acanthias*, *Squalus spinax*, and *Selachus maximus*. These, with many other varieties frequenting the Norwegian coasts, have all of them livers yielding oil.

Now, remembering that some of the fishermen are agricultural laborers, and that all belong to the lower and least educated classes; also, that the livers are treated by them at their own huts without any kind of supervision; and that they are not only indifferent to but probably ignorant of the medicinal superiority of cod-liver over other livers; also that higher prices are realized at Bergen for one kind of oil than for another,—these things together may, without making any uncharitable imputations, possibly tempt these men to sell as true Lofoden oil the compound products of their several local fisheries. There is reason to believe that this is actually done; that the dealers in Bergen, who are as a class without pretension to scientific skill, buy without precaution and sell without scruple as Lofoden oil much that has never been at Lofoden, and has not been carefully made exclusively from cod-liver. Of the oils taken to market at Bergen, those prepared by the peasants are open to less objection than those prepared by the fishermen; for the laborers fish only during the season at Lofoden, where they can take cod-livers alone, and during the remainder of the year follow other kinds of labor along the long narrow fjords, which are entered by few fish.

These northern islands claim to be the only place in the world where the cod-fish, the true *Gadus morrhua*, is found in immense shoals, absolutely alone. Whether this be so or not is a question that, with our present limited knowledge of fisheries throughout the world, and especially of those at Newfoundland, may be left till more information has been accumulated; at present it is enough to know that Lofoden does possess this very remarkable advantage, and that the produce of its fisheries is a true cod-liver oil beyond doubt or suspicion.

Fully sensible of the great natural advantages possessed by these islands, Mr. Möller of Christiania, has been for many years desirous of introducing into general use a superior method of preparing the oil. Manufactories following his suggestions are in operation at Lofoden, Söndmøre, Christiansund and Finmark. About twelve years ago he endeavored to secure the results of his process by means of a patent, but without success. The government, however, recognized the superiority of his method as well as the value of his services to an important branch of national industry, and his Majesty the King of Norway and Sweden was pleased to confer upon him the Vasa Order.

The process he recommends may be thus described:—The livers are to be treated immediately on their arrival on shore, being less than one day old; they are first to be carefully examined, and all poor, bruised, small, and diseased livers rejected; all gall-bladders are to be watched for and removed; the selected livers, all of large size, are to be washed in several waters for the purpose of removing blood, membrane, and all other impurities. They are then to be introduced into a machine which minces them into very small pieces, or rather reduces them into a paste. This paste is then to be transferred to an apparatus, heated externally by steam, and the mass cautiously warmed to 100° or 120° Fahr.; at the same time it is to be diligently stirred and pressed with large wooden spoons, so that the oil may be liberated at the lowest possible temperature consistent with economic results. As fast as the oil separates, it is to be withdrawn; and the stearine being first thrown down by exposure to a temperature under 40° Fahr., it is to be filtered. After filtration it is considered perfect, and may be put forth with into barrels and bottles. The fresher the liver, and the lower the temperature, the clearer, lighter, and sweeter in taste will be the oil. Livers more than one day old require a higher degree of heat.

Three barrels of liver will yield one barrel of the finer oils, and a quarter of a barrel of dark oil; but these proportions are only approximative, for the results will always vary according to the temperature employed in the process. The best oil made in

this manner will cost from eight to nine shillings per gallon. It is never originally brown, but is liable by lying long in wooden casks to acquire a little more color.

The annual produce of cod-liver oil by the Lofoden fisheries is estimated at 25,000 barrels, each containing from 24 to 28 English gallons, and that of all the other fisheries on the coast of Norway at about 35,000 barrels more, making a total of 60,000 barrels. During the last two years, prices have not been sufficiently remunerative to encourage the preparation of the fine oil on a large scale; only two manufacturers at Lofoden have done so, and one of these, according to the chief of the surveillance, made only ten barrels this year.

The prices formerly obtained by the fishermen at Lofoden for their livers were from six to seven specie-dollars per barrel, equal to 27s. to 31s. 6d. English; now they are from nine to ten specie-dollars, equal to 40s. 6d. to 45s. English.

Such is the information supplied to us from Norway; for our convenience it may be briefly grouped as follows, under five heads:—

1. Genuine Lofoden oil is true cod-liver oil made from the *Gadus morrhua*.
2. The light yellow oil is not inferior to the light brown oil.
3. Oil sold at Bergen is not necessarily Lofoden oil, or even pure cod-liver oil, although so called.
4. The relative absence of color, odor, and taste are guarantees that the process of separation has been properly conducted at a low temperature.
5. The annual supply of new cod-liver oil from Norway may be expected in the European markets during the month of July.

Cod-fish abound only in the cold and temperate seas of the northern hemisphere; they are found on all the coasts of north Europe, and upon the shores of the British Islands; it is probable they do not proceed much further in a southerly direction. One or two rare species have been noticed in the Mediterranean, but none have ever yet been described as inhabiting the great Pacific Ocean or the seas of India or the East. Their habitat is thus reduced to recognizable limits.

Thirty-six millions of fish are annually caught, dried and salted at Newfoundland, Iceland, Norway and Sweden; these, under the name of stock-fish, are exported to all parts of the world. Let it be allowed that half as many more are sent to market when fresh, this will give a total of 54,000,000, a number that would appear to imperil the duration and very existence of the species. But the fecundity of this fish is so great that 9,000,000 of eggs have been found in the roe of one female. Hence, six female cod would, under favorable circumstances, supply to the whole human family, annually, their present demand for this important article of food. Cod-fish would soon fill the northern seas and become as multitudinous as the sands beneath them, if other and more effective agencies than those of man were not constantly at work to keep their numbers in subjection.

The information now incidentally given relating to the propagation of the cod, the deposit of its ova, and the security of the young fry is, though limited, an important addition to our knowledge of the natural habits of this fish; should further observations confirm the opinion held by practical men on the spot, then it will appear that Lofoden is the natural nursery for these immense shoals of cod that swarm the northern seas. Of course, cod ova may be deposited and hatched on many coasts, our own included, but nowhere on the same scale and with the same great results as at Lofoden. Collateral evidence in support of this view is furnished from Finmark, where, after the Lofoden season is over, cod-fish and the *Gadus virens* are found associating together in equal numbers. Now, the *Gadus virens* is the young of the *Gadus carbonarius*, these being two names given to the same fish at different periods of growth; young cod presenting no marked characteristics whereby they essentially differ from the mature fish, have not a separate name; but the fact of these two species, the *Gadus morrhua* and *Gadus virens*, being found together in large shoals, and one of them young, renders it probable that the other is young also. Again, we know that the proper season of the year for the cod to spawn is the month of February; and this supports the view taken, that the chief object of the cod in visiting the Lofoden Islands in January is for the purpose of depositing their ova.

These things being so, we may advance to another proposition. Immense shoals of cod arriving from the deep sea make their annual appearance on the Norwegian coast early in January, and continue there to the end of April, when the last of them return. We are already in possession of the fact that at Newfoundland the shoals of cod arrive at the end of June and retire in October. By a comparison of these dates, it is apparent that their arrival first on one coast, then on the other, and their departure first from one coast, then from the other, are separated by exact intervals of six months. In both cases they come from and return to the deep sea, that is, the Atlantic Ocean. At Lofoden they arrive, and now alledged, for the purpose of spawning; at Newfoundland, certainly as fish of prey. At Lofoden, all other kinds of fish fly before them and are suffered to escape; at Newfoundland, they follow in fierce pursuit shoals of capelin, cuttlefish and herrings. At Lofoden, they arrive in their finest and best condition, leaving thin and emaciated; at Newfoundland they arrive hungry and ravenous, devouring their prey with the greatest voracity, till at last they become gorged and no longer able to feed; in this state, previous to their departure, they can be seen through the clear water to refuse their favorite food held before them as bait. From the great bank of Newfoundland to Lofoden flows that powerful equalizer of temperatures, that warm river in the sea, the great Gulf Stream. In its course, and about midway between Lofoden and Newfoundland, is the island of Iceland; cod leaving Lofoden in March to arrive at Newfoundland in June and July, might be expected between these dates to appear on the fishing-grounds of this island; they actually do so, the chief cod-fishery in Iceland occurring in the spring and summer. Finally, cod approach Lofoden from the south-west; Newfoundland is due south-west of Lofoden.

Weighing these facts, a very interesting and important inquiry presents itself, whether these multitudes of fish, retiring as they do from one and appearing on the opposite side of a great ocean at definite and exact intervals, may not be composed of the same individuals moving in prodigious numbers and probably in detached shoals, urged by a powerful instinct to pursue systematic

and periodical migrations,—to the East for the purpose of propagation, and to the West in pursuit of food.—*Lond. Pharm. Jour.*, Jan., 1868.

ON SYRUPUS CALCIS.

By DR. E. R. SQUIBB.

In a communication Dr. Buckingham says :

"I enclose a letter from Dr. Squibb, of New York, which I received with some lime prepared with sugar. I trust that those who have undertaken to make the syrup and failed, will not be discouraged. I must caution against the use of the article in pill or dissolved in water, as it will produce nausea, or even a caustic effect. It should be given in milk. I have used it in doses as large as forty-five drops every two hours. Generally, thirty-drops every three hours have been sufficient. I have never found alkaline urine to follow its use, no matter how large nor how frequent the dose."

Brooklyn, March 16, 1867.

DR. C. E. BUCKINGHAM, Boston.

Dear Sir,—Your paragraph, on the back of the reprint from the *Boston Medical and Surgical Journal*, came duly and has occupied me ever since, though it gave you little trouble to write. On the authority of the books generally, I did not know whether you or they were wrong, and to determine this had to go over the subject practically. I will not trouble you nor take up my time with any detail, but give you the results to use as you see proper. Sacrate of lime is a very definite thing chemically, and is soluble to any extent in solutions of sugar. To make it, it is only necessary to have lime, either caustic or hydrated, no matter which, associated with about three times its weight of sugar; but to render it soluble an additional proportion of sugar is necessary. The best proportion, practically arrived at, was one part caustic lime (or two parts hydrate or slaked lime), with eight parts of dry white sugar, rubbed together and poured into ten parts of boiling water, and boiled a few minutes; then dilu-

ted with forty or fifty parts of cold water and filtered through white paper, and the filtrate evaporated until the residue is quite brittle when cold. This is then rubbed to powder, and best given in a pill. The powder is, however, perfectly soluble in water, and if properly dried will contain between 8 and 10 per cent. of its weight of caustic lime. The powder may be dissolved in milk or any watery vehicle. A very good formula is to take of good clean well burned lime 400 grains, dry granulated white sugar 2300 grains. Triturate well together in a mortar, and then add the powder to f̄viii. of boiling water contained in a proper vessel (well tinned iron or bright copper answers), and boil the mixture with constant stirring for five minutes. Then dilute to two parts with cold water, and filter through white paper. Finally evaporate to whatever consistence may be desired. If the evaporation be carried on until the liquid measures a pint, each fluidounce will contain about 24 grains of caustic lime, and this is about as dense a syrup as can be conveniently dispensed. If carried to f̄xii. each fluidounce will contain about 32 grains of lime or 4 grains to the fluidrachm. But this syrup is too thick for convenient management in dispensing. If the evaporation be continued to dryness, great care must be taken to avoid discoloration and scorching as the fluid thickens and tends to bake on the bottom of the vessel. As it thickens it must be stirred continuously and kept from adhering to the vessel until all becomes translucent, tough and ropy. It finally becomes so tough as to be very difficult to stir properly, and when a small thread of it on cooling becomes very brittle and capable of being rubbed or crushed into small particles between the thumb and finger, the heating may be finished. When cold and brittle it should be rubbed to fine powder, and this powder, according to the extent to which the drying has been carried, will contain from 8 to 10 grains in the hundred of caustic lime.

The process is simple and easy, and requires so little skill and dexterity that any ordinary pharmacist of the most limited acquirements will be able to make it without difficulty.—*Med. and Surg. Reporter, Phila., Nov. 9, 1867.*

TRANSPARENCY OF MOLTEN METALS.

The assertion of Secchi, a few months ago, regarding the transparency of heated iron, has given rise to much talk; but we have not yet seen it confirmed by the statement of any other competent eye-witness. Meanwhile, however, many assertions have been made as to the transparency of metals when melted; and the evidence on this point begins to stagger the *savans*. It so happens, that, so far as we are aware, no professional chemist or educated physicist has yet testified to the phenomenon as actually observed by him. It is merely said in various quarters to be a fact, well known to the workmen employed in melting and moulding certain metals. We deem it, therefore, important to mention the first authentic endorsement which has come to our notice. M. Paul Morin, the accomplished chemist in charge of the Aluminium Bronze Works near Paris, asserts that the melted alloy, when poured into the mould, is transparent; and Mr. T. Sterry Hunt, to whom the assertion was made, and who saw the operation performed, assures us that the appearance of the molten stream seemed to corroborate the statement. There is a possibility of optical illusion in the inspection of a body which is itself intensely luminous, to discover whether it is transparent. We suggest that the question may be easily settled by the means employed to show the transparency of ordinary flame, namely, by burning magnesium, or in some other way producing a more brilliant light, behind it. The aluminium bronze is remarkable for two things, among other qualities, which distinguish it from ordinary alloys. One is the intense temperature developed by the union of the two metals, and the other is the extreme fluidity of the molten compound. Perhaps these qualities may be connected with the alledged phenomenon of transparency. Copper may also be transparent in the liquid state; but, in pouring it into moulds, it often oxidizes very rapidly; and the whole liquid mass is believed to be filled with disseminated particles of the red oxide of copper, which is opaque. Whether from this cause or not, we cannot say, but the evidence as to the transparency of molten copper, as likewise in the case of other metals, is still conflicting and inconclusive. *Chem. News, Nov. 22, 1867, from Amer. Jour. Min.*

HISTORICAL SKETCH OF THE DISMEMBERMENT OF PHARMACY FROM PHYSIC.*

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The distribution of the healing art into the three several branches of Medicine, Surgery and Pharmacy has no foundation in nature, is artificial, and a comparatively modern invention.

That whoever undertook the treatment of the sick, not only devised the remedies, but prepared them for administration, is sufficiently probable; and that such a practice prevailed in the earliest ages of the healing art, in all countries the records of which have reached us, is placed beyond doubt by ancient testimony. Such were the duties of the Roman medicus, or of the Grecian *ιατρος*: such are the duties of the modern general practitioner; the general practitioner is therefore the most ancient as well as, in a certain sense, the most extensively useful representative of the medical profession. Until comparatively modern times the pure physician, as he is now called, had no existence, and it might be readily conceived, even were there no historical evidence of the fact, that the treatment of every morbid condition of the human body was undertaken by the same person.

But there is abundant proof that such a practice prevailed, not only in the earliest ages of the healing art, but at all times down to a comparatively modern period. We find ancient writers on the composition of medicines addressing the reader in the second person, and instructing him, not only how to prepare each remedy, but to employ it in the treatment of disease; indeed, there are very few of them who do not enter into the medical use of the articles described. We find that persons who sold simples to the multitude were taken into the employment of physicians, and gradually acquiring knowledge in this way, often ventured to do a little on their own account; and as there was no tribunal to test competence, they became general practitioners, like those who originally employed them. Pliny informs us that the physicians of his day, and of a period long before it,

* In compliance with the wishes of the Editor, that I should give a reference to the authorities from whom I quote, I have done so in the following communication.

were little better than specious imposters. An indignant Roman, who had some experience of doctors, and wished to perpetuate his opinion of the skill of those who attended him during his last illness, directed the following inscription to be engraved on his tomb :

"Turba medicorum perii."

That public shops were kept by physicians appears from several instances, but particularly from the fact stated by Cassius Hæmina (quoted by Pliny), that Archagathus, a Grecian physician, who settled at Rome B. C. 218, had a shop provided for him to receive his patients, bought at the expense of the city ; this shop stood in the cross-street of Acilius. On his first arrival he was much employed, and his income was considerable. But having an unlucky predilection for cutting, cauterising, and amputating, and the Romans having a very great disrelish for this sort of practice, he soon lost his popularity, and was called the human butcher. This man's unpopularity brought the whole profession into disrepute at Rome. Plautus, who flourished two centuries before Christ, in his comedy called *Mercator*, puts into the mouth of one of his characters, "*ibo ad medicum atque me ibi toxico morti dabo.*" This is an important sentence—"I will go to a physician, and *there* terminate my existence by poison." It appears that the physicians kept shops or magazines where medicines and poisons could be bought, and where it was not unusual for the patient to swallow the dose.

Scribonius Largus lived in the reigns of the Emperors Tiberius and Claudius, that is, in the middle of the first century of the Christian era. He was certainly a physician, although Dr. James calls him "a medicinal writer;" for, in his epistle to Caius Julius Callisto, he says, "*Hippocrates conditor nostræ professionis,*" and a practising one also ; for, speaking of the use of a certain remedy in many disorders, he says—"et ego magna ex parte expertus sum." That he compounded his own medicine appears from his own peroration, where he says, "*harum compositionum ipse composui plurimas.*" And that he kept ready-prepared medicine for his patients, or officinal formulæ, appears from what he says of a particular medicine of which he thought highly, "*quamobrem semper habeo id compositum.*"

Scribonius practised in the manner of other physicians. He tells us of one Pacchiochus Antiochus, a physician also, who had a secret remedy, originally invented by Appollonius, so profitable to him that he would never disclose its composition, although often solicited. Scribonius says, "*ipse enim clausus componebat, nec uli suorum committebat. Plura enim quam recipit ipsemet contundi jubebat pigmenta fallendi suos causa.*" We therefore find this physician compounding his nostrum in secret, and purchasing and pounding more drugs than he employed, in order to deceive his own family. We also find an implied allusion to the servant whose province it was to powder the different articles, for in those days, as the present, pestles and mortars were used by the medical practitioners; they were made of Ephesian or Theban marble, but the best were made of a stone called Basanites, it not suffering by abrasion, and therefore communicating nothing to the medicine. After the death of Pacchiochus Antiochus, his wonderful secret was disclosed by Tiberius Cæsar, by whose orders its composition was placed in the public libraries; its chief ingredients were colocynth, saffron, some herbs, spices, and gum-resins made into a confection with honey. Scribonius and Marcellus both give this history in the same words.

Galen, notwithstanding his extensive experience, and his high rank as a physician, conducted the business of pharmacy also at his own house. No doubt he kept a servant to do the heaviest part of the duty. After detailing the symptoms of his patients he frequently says—"I compounded for him the following medicine." Even some of the most disagreeable departments of pharmacy were transacted at his house. I need not refer to the disgusting details of his mode of procuring human fæces, which he used as remedies.

There was a physician named Cosmus, who, as Marcellus informs us, had amongst his secrets a wonderful collyrium, which cured all diseases of the eyes, and consisted of twenty-eight ingredients. From this it is plain that Cosmus must have compounded and sold it himself, or it could not have remained a secret. To have compounded twenty-eight ingredients into one collyrium seems to imply the possession of no small pharmaceutical skill, and we learn from the facts described that regular

physicians compounded secret nostrums without incurring professional opprobrium.

The same author mentions that the physician Soranus, who is alluded to by other ancient writers also, settled in Aquitania, where he attended 200 persons laboring under mentagra, or some obstinate spreading disease of the skin of the face. Soranus used to apply a kind of ointment of cantharides to the part affected, having previously carefully bathed the face with an alkaline solution. These remedies were applied to the face by the physician himself, and this gives us some further insight into the nature of the medical practice of the time.

The foregoing facts, and many others that might be adduced, establish the fact that the physicians of ancient times practised medicine, surgery, and pharmacy; that they kept shops or repositories of medicine, with which they were always well provided: in short, that they were just the same as the general practitioners of the present day. Galen mentions that Cassius, a celebrated physician of Rome, kept a slave named Atimetus, for compounding a medicine of his invention.

We find that the same combination continued to obtain for several centuries after the period to which the foregoing observations apply; at least, in some countries, this was the case in the strictest sense, although, in others, there were some physicians who began to entrust their duties to persons who were very badly qualified for their performance. In Arabia, the combination of the three professions can be traced through a long series of ages. Serapion (the Arabian), who, in the eighth century, wrote a work on pharmacy, evidently addresses students in the practice of medicine when he teaches the art of compounding. He says, "For him who wishes to compound medicines as he ought, it is necessary that he understand their virtues profoundly," "therefore a knowledge of the degrees of the powers of medicines is the foundation on which he must depend in the cure of disease." "You require a recondite knowledge of simple medicines, so that by their aid you may be competent to compound, in all places, from the articles which you find."

Mesue, an eminent practitioner, and fourth in descent from Abdela, king of Damascus, writes in the same strain; and, while teaching pharmacy, evidently addresses medical students.

The same may be said of Avicenna, who wrote in the tenth century. Speaking of the Tyriaca Esdræ, he says, "*et de medicis sunt quidam qui ponunt in ea de ammoniaco; et, de iis, sunt quibus illud non videtur quoniam ammoniacum nocet stomacho.*"

In order to render this matter more intelligible, it will be proper to give an account of the different classes of persons who, in addition to those already mentioned, had any connection with the collection or sale of medicines; and to endeavor to ascertain what were the real functions of those persons, and what was the extent of their connection with the healing art.

It will no doubt occur to many that the word apothecary is frequently found in the English translation of the Old Testament, and that his art is there referred to, thus leading to the great error of supposing that in these passages we have evidence of the separate practice of pharmacy at the period alluded to. In Exodus we find the following: "And thou shalt make it an oil of holy ointment, an ointment compounded after the art of the apothecary;" and "thou shalt make it a perfume, a confection after the art of the apothecary, tempered together, pure and holy;" and in 1st Samuel it is said—"And he will take your daughters to be confectionaries, and to be cooks, and to be bakers." The word "confectioner" here used is, in the original, the same as in the other passages translated by the word "apothecary." Now, one of the earliest forms of medicine was called a confection; there are compounds of the present day which have the same name in the pharmacopœias, and hence medicinal confections are nearly two thousand years old. Those who made and sold such compounds were, in later times, called "confectionarii." By the edict of Frederic I., in the beginning of the thirteenth century, the confectionarii were legally established in the southern parts of Italy, under an oath that they would always have in readiness fresh and adequate medicines, the price of which was regulated by the edict; and that they would prepare medicines exactly according to the prescriptions of physicians. Yet, Actuarius, a celebrated physician, who practised at Constantinople in the thirteenth century, in his work *de medicam. comp.*, gave a list of medicines which might be substituted for others deemed of the same power (*Mangeti Bibl.*), and other

tables of succedanea have since appeared. Besides these medicines compounded with honey or sugar, the confectionarii sold sweetmeats. They were also called apothecaries, along with some other traders who sold merchandise; for apothecary merely means a shop or magazine where any sort of merchandise is sold—and apothecarius is the proprietor of such. Thus, from the intermixture of the two trades, a confusion of names ensued; and it is on this account, no doubt, that we find in Scripture the same word one time translated “apothecary,” and at another time confectioner. Even in the present time apothecaries sell what are called confections, and confectioners sell medicated lozenges. I have looked into a MS. Bible in the British Museum, supposed to be older than Wycliffe’s, for the passages in which the word “apothecary” occurs in our present translation, and find that, in all cases, it is translated “oyntemente maker,” but that is not an apothecary.

The trade of preparing and vending ointments and aromatics seems to have been extensively practised in early Greece and Rome; but the persons who carried it on frequently sold certain medicines along with these, other wares. None of them sold medicines exclusively.

The Lacedæmonians banished ointment-makers because they wasted oil, and dyers because they destroyed the whiteness of wool. The sage Solon interdicted the sale of ointments altogether, as only appertaining to luxury (Athenæus). The ointments used in the time of Homer were kept in alabaster boxes; they were also kept in vases. The picture of one is given in “*Le pitture antiche d’Ercolano*,” the narrow mouth of which shows that these ointments must have been liquid. The Romans had a different ointment for the different parts of the body. The ointments bore a higher price than any other luxury. When an Egyptian king died no one dare use them (Diod. Sic.) So perfect were the Egyptians in the manufacture of these odoriferous ointments, that an ancient specimen still exists which retains its perfume. The spikenard of the ancients, from which so costly an ointment was prepared, was determined by Sir Wm. Jones to be a protean plant, valerian, a sister of the mountain and Celtic nard. (*Asiatic Researches*.)

The market-place at Capua, where perfumes and scented ointments were sold, was called Seplasia. The person who sold the ointments was called *μυροπωλης*; the maker of them was called *μυρεφους*, or ointment boiler. But there were persons who, besides ointments and perfumes, sold the articles used by physicians, and as they frequented the Seplasia, they were called seplasiarii. This name continued in use for many centuries, and at last was used to designate the persons who compounded for physicians, their province not being to prescribe. In this sense we find the word used so late as 1541. The work of Nicolaus Alexandrinus was written, as he himself says, for the use of the physician and the seplasiarius. Whoever wishes to learn the exact nature of the office of the seplasiarii, and unguentarii, and their defence against the imputation of base practices, will find it in a work published at Rome 1603, entitled "*Collegii aromatoriorum almæ urbis, nominis pharmacopolæ et seplasiarii pro defensione animadversio.*" The ancient seplasiarii had been charged by Pliny with sophisticating their drugs, and selling stale plasters and eye-salves, the refuse of their stock. We learn from the same author that the physicians not only purchased this refuse, instead of making their own compounds, but were even ignorant of their composition, to the great detriment and danger of their patients.

The name medicamentarii signified the same as pharmacopolæ; for medicamentum, like pharmacon, is either a remedy or a poison; and medicamentarius is a vendor of both. The pharmacopolæ were in the habit of sitting the whole day in the forum, with their little vessels, boxes, and baskets, and did not return home until a late hour. Some of those persons, instead of standing stationary at their stalls, wandered about with their wares; they were called *περιοδευτης*, or medici circumforanei; in late times they obtained the name of mountebanks, which is a literal translation of the Latin name saltimbanci—the French call them charlatans.

There was an extensive and useful class of dealers called *pigmentarii*, from the Latin pigmentum. Although they originally sold painting materials, they gradually added other commodities, such as exotics, spices, all sorts of condiments, and medicinal

substances. Another class of persons who were connected with the sale of these commodities were the *παντοπωλαι*, who retailed incense, scents, along with all those articles which were used by painters, dyers, ointment boilers and physicians. Medicines were called *ιατρικη υλη*, or physicians' materials; and this is the origin of the Latin words *materia medica*. Very little different from the pantopolæ were the *ρωποπωλαι*; they not only sold medicines, simple and compound, but they prepared the latter, and especially counterpoisons, along with the foregoing articles. The pharmacopolæ carried on a trade, the nature of which may be collected from the derivation of their name. The word *φαρμακον* means a drug possessed of active qualities, whether salutary or poisonous; the name *φαρμακοπωλης* therefore signifies a vendor of drugs, whether salutary or poisonous; and the word was translated into Latin by *aconitarius* or poisoner, from *aconitum*, the poison *monkshood*.

Theophrastus gives a curious account of the tricks, superstitions, ignorance and knavery of the pharmacopolists, and rhizotomists or herbarists, of his time (B. C. about three centuries), and of the devices by which they sought to mystify their art. From this author we learn that the herbarists order some articles to be collected when the wind is in such a direction as will permit the effluvia to be blown away, such as the fruit of the dog-briar, for otherwise, say they, there will be danger to the eyes. Other articles cannot be safely gathered unless the body of the herbarist is smeared with oil, to defend it from noxious vapors. They asserted, for instance, that hellebore is of so acrimonious a nature, and so certain of affecting the head, that it is not possible to dig it for any considerable length of time. Other herbs were declared to be dangerous if cut at any other time than at night; others should be cut by day; and others, again, before sunrise, under penalty of various fanciful dangers. They found it necessary to say their prayers while they gathered some, or otherwise to protect themselves by describing circles round the plant with a two-edged sword. Sometimes, the operator, while at his work, should look towards the west, sometimes towards the east, at the same time saying his prayers. Other times, a mode very different from this pious process of herb-gathering was resorted to:

the operator was directed to dance about in a circle, and while thus gamboling, to utter a variety of lascivious expressions. Above all things, they were to guard against the approach of an eagle, for if this ill-omened bird flew very near one of these herbarists, so envied by the gods for their power over human life, the world was sure to be deprived of the valuable services of this personage in the succeeding year. Theophrastus was too sagacious a person to be deceived by these imposters into a belief of their crafty fictions; he merely relates them as fabrications. Not so Herodotus, who, having been a much more credulous character, often allowed himself to be made the vehicle to posterity of many an absurdity. Be this as it may, it is certain that the rhizotomists and pharmacopolists did all in their power to monopolize the trade, and extort a high price for their services by their impudent falsehoods.

It is not surprising that when the list of *materia medica* became numerous, and when many articles were brought from foreign countries at great trouble and expense, the physicians should employ other persons to supply them; it is, indeed, more a matter of surprise that they were ever able to supply themselves. Previously to the days of Herophilus, the pupils of physicians used to go into forests and deserts to collect simples at different seasons. We learn from Horace that there was a whole street in Rome occupied by persons who sold this kind of merchandise.

In the fourth century of Christianity, we find traces of the partial separation of pharmacy from medicine; and mention is occasionally made of physicians who prescribed for the sick, and caused their prescriptions to be compounded by the *pigmentarius*, as in the well-known passage of Olympiodorus. This innovation made a very slow progress, and it would be tedious and useless to follow up its history, so gradual was the change. The learned Conringius, writing on this subject, and on the utility of public pharmaceutical establishments, says—"plurimis quidem seculiscaruit iis (officinis publicis) ars medica, ipsis medentibus domi pharmaca sua conficientibus. Idem mos hodieque obtinet per omnum Asiam. In Africa primum videntur medici hanc curam á sese in alios rejicisse, ante hos quingentos amplius

annos. Avenzoaris sanè ævo qui seculi duodecimi initio undecimi fine floruit, morem illum in Africa obtinuisse, non videtur dubitandum."

Thus, according to Conringius, the physicians of Africa were the first that surrendered the practice of pharmacy into other hands, and the change began about the end of the eleventh century. The custom passed from Africa into Spain, and thence to Italy, where the confectionarii were established by the edict of Frederic II., king of the two Sicilies, under an oath that they would prepare medicines exactly according to the prescription of physicians. The better to carry this salutary regulation into effect, the physicians were directed to inspect the shops, which were called *stationes*, where the business of compounding was transacted. Thus, in the southern parts of Italy, the separation of physic and pharmacy was, for the first time, enjoined by royal authority.

All that we learn from Conringius is that the separate practice of pharmacy became more general in Africa than in other parts of the world; but it by no means follows that there was any formal dismemberment of medicine at that particular time. It was like any other great change, a very gradual and slow process. We find that the connection subsisted in other countries for centuries after this. Of many instances that might be given, I shall adduce one only, and a remarkable one, from the writings of the German alchemist Glauber, who lived about the middle of the seventeenth century. Speaking of the German physicians, he says that they bought medicines from apothecaries and chemists, and that after putting them through some further preparations, they administered them to their patients. He adds that many physicians take more care of their kitchens than of their patients, and, by buying ill-prepared medicines from unskilful persons, bring the noble art of the chemist into disrepute. But he admits that an industrious and accurate physician is not ashamed to make his medicines himself.

The first distinct declaration that I have been able to find, which defines the duties of a compounder of medicine as separated from those of the physician, is in a work written by Saladin, of Ascalon, chief physician to the Prince of Tarento. Tira-

boschi, quoting Fabricius, says that Saladin was alive in 1163. This pompous physician begins his book, which is without a date, by declaring that on account of the ignorance and unskillfulness of the *Aromatarii*,—for this is the name under which the ancient pigmentarii were then designated,—the most learned doctors are brought into contempt, and much danger results. Therefore (he says), moved by compassion for physicians, and by the entreaties of many aromatarii—I, Saladin, Doctor of Arts and of Medicine, have determined to write this treatise, entitled "*Compendium Aromatariorum*." Saladin seems to have been the first that proposed that the aromatarii should not be allowed to compound medicines without submitting to examination by skilful physicians; and, if found ignorant, that they should be visited with condign punishment. His book is written with the design of being the text for examination. The first question in it is "What is the duty of an aromatarius?" The answer is "terere, abluere, infundere, coquere, destillare, bene conficere, et confecta bene conservare. Propter quæ omnia dico ulterius quod aromatarii tenentur scire grammaticam, ut valeant bene intelligere dispensationes receptorum, et antidotariorum et scientiæ medicinæ." Here, then, is a clear definition of an aromatarius of Tarento about the year 1163. Saladin further describes what sort of person an aromatarius or apothecary should be. He ought not to be a boy, nor very young; nor proud, pompous, or addicted to women and vanity. He should be a stranger to the gaming table and tavern. Neither for love, fear, or money shall he do anything contrary to conscience or the honor of a physician. He shall not administer to pregnant women medicines calculated to provoke abortion; nor through fear of power, or love of money, shall he prepare poisonous medicines or poisoned cups; nor make syrups with honey which should be made with sugar. The aromatarius, of himself and without the permission and advice of a skilful physician, is not to do anything, and especially he is not to add anything to laxative medicines. He is to reject spoiled medicines and pills which have become as hard as stones, and he shall not substitute one thing for another when he happens not to have the article. Saladin lastly informs us of a very important part of the duty of the aromatarius, one

which, if used in the present day, would be considered a very gratuitous exercise of his duty :—"The aromatarius," he says, "should know the taste and smell of the different simples, so that if any young and inexperienced physician should wish to prescribe horrible or disgusting medicines for any sick person, the aromatarius shall not allow it to be done, but shall expostulate with the physician in order that better and more agreeable ones may be substituted, lest by the use of the former the stomach of the patient be disturbed.

To these prudent instructions, for the benefit of the aromatarius, Saladin subjoins others still more prudent, touching the utility of a wife, and how much such an appendage to his establishment tends to keep him in order.

From this book we at least learn that the edict of Frederic II. was not inoperative in the southern parts of Italy, and that the profession of the compounder of medicine was, in Italy, in the twelfth century, perfectly distinct from that of the prescriber. We also learn that the compounders were so ignorant as to bring physicians into disrepute ; and that some of them were so nefarious as to prepare poison-potions for any one that paid them, as indeed is broadly hinted in the "Golden Ass" of Apuleius. The ignorance of the aromatarii seems to have been an universal subject of complaint and dread to physicians ; and the labors of Saladin seem to have very little improved them. For, in half a century after, we find in the *Thesaurus Aromatoriorum*, written by Paulus Svardus about the beginning of the sixteenth century, and dedicated to "The Most Worshipful Doctors of the College of Milan," the following passage—"cum animadverterem, colendissimi doctores, quamplures, in nonnullis aromatoriorum apothecis, errores ignorantia committi, etc.," and it was on this account or pretext that he published his book.

There is some uncertainty about the etymology of the word apothecary. Spelman defines apothecarii thus—"vaticinatores, procuratores, anglicè stewards." *Apotheca*, a magazine, from *apo*, an intensive preposition, and *τιθημι*, to put up ; and apothecarius should mean the steward who puts things together with care. We have certain evidence of the word apothecary in a medical sense, and confirmed by use in such a manner as to con-

stitute an acknowledged word in the public acts of England in the middle of the fourteenth century. We find in Rymer's *Fœdera*, Anno 1345, a grant of sixpence a day to "*dilectus Coursus de Gangeland Apothecarius Londoniæ*," "*propter curam sollicitam circa nos*;" what this personal care of the apothecary was we are not told. Yet, in Rymer, 1537, we find John Soda designated *Pharmacopolam*, showing that both names were in use in England at that time. For attending the Lady Mary he had 40 marks a year. An army doctor had 4d. a day. Fosbrooke says that the apothecaries first appeared in England in 1345; but the grant to Coursus de Gangeland shows that they were then well known in London. In the south of Europe the word apothecarius was commonly used, and aromatarius was generally laid aside; and in 1504, a Doctor of Medicine and Arts published a book which he called *Lumen Apothecariorum*.

About the middle of the same century, during the reign of Elizabeth, a physician named Bulleyn thought fit to lecture the apothecaries of his time in much the same strain as did Saladin nearly four centuries before. His rules for the life and conduct of an apothecary have been preserved by Mr. Jeafferson; they afford a good specimen of the supremacy assumed by physicians over apothecaries in past times. The following are extracts:—"The apothecary must not be suborned for money to hurt mankind; his house and shop must be cleanly; his mortars, stills, pots, etc., must be clean and sweet; he must have charcoal at hand to make decoctions; he must have a clean place in his shop for physic, and 'a baser place for the chirurgerie stuff;' he must 'neither increase nor diminish the physician's bill (prescription), and keep it up for his own discharge;' he shall neither buy nor sell rotten drugs; he shall not substitute one ingredient for another in a prescription; he shall meddle only in his own vocation, and remember that '*his office is only to be the physician's cook*;' he shall use true measure and weight."—(A book about Doctors.)

The only part of this, in the present day, unnecessary advice with which the apothecary does not comply, is that important one of keeping the prescription "*for his own discharge*." Of late years the physician instructs his patient to produce his last pre-

scription "at the next visit." The patient, preferring the original to a copy, obtains it—thus depriving the apothecary of the *means of recovering the debt*, should compulsion become necessary, and of exculpating himself, should any untoward circumstance occur.—*Med. Press and Circ.*, Oct. 30, 1867.

LASTER'S NEW METHOD OF PREPARING THE SULPHATE OF MANGANESE.

COMMUNICATED BY ALEXANDER J. SEMMES, M. D.

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The various combinations of manganese have been employed comparatively but a short time in pharmaceutical operations, and in the treatment of disease; the economy of their preparation being but partially understood, it was with the hope of rendering their preparation easier that Mr. Laster, the accomplished Chemist of the Charity Hospital, was induced, after careful examination, to suggest his new process to the Pharmaceutist.

Among the more important salts of manganese susceptible of therapeutic application, may be mentioned the sulphate, carbonate, phosphate, iodide, and chloride of manganese; the sulphate is, of this number, the most important from its use as a technical and medicinal agent; it is manufactured upon the large scale for dyeing purposes by heating a mixture of sulphate of iron and binoxide of manganese to redness; the sulphate is decomposed at the high temperature, becoming sesquioxidized at the expense of a portion of the acid, the undecomposed acid uniting with a portion of protoxide of manganese 'produced under the circumstances.

Some would suppose this to be an easy process, and that the iron was sesquioxidized at the expense of the binoxide instead of the acid; but such is not the case, for the sulphate of iron commences to decompose rapidly at a low red heat, whereas the binoxide requires a full red heat for its partial decomposition.

Again, if the binoxide, instead of the acid, sesquioxidizes the iron, there should be no elimination of sulphurous acid, which is

the case directly after the heat has reached redness, and there should be no elimination of free oxygen, as takes place when the heat becomes full red; consequently we may know from these phenomena that there is loss of acid from its decomposition, also a loss of sulphate of manganese, because at the high temperature the sulphate is decomposed into protosulphate of manganese, sulphurous and sulphuric acids, thus $(3 \text{ MnO SO}_3) = \text{SO}_2, 2 \text{ SO}_3 + \text{Mn}_2\text{O}_3$, and whatever be the proportions of sulphate or binoxide used in this process there will be an excess of protosulphate of manganese. The mass, after cooling, is to be subjected to the action of water, which removes the sulphate of manganese, which is freed from iron by the usual process. This method of preparing the above sulphate is the most laborious, and the results generally unsatisfactory.

A second method is to heat binoxide of manganese with sulphuric acid, and after the mass has cooled, again treating with sulphuric acid, the moistened mass is to be again heated; the portion of sulphate of manganese formed is to be removed and treated as in the first process. Operating in this manner we not only use an excess of sulphuric acid, which is driven off at the high temperature, but we have the bin, or as Mr. Laster more properly expresses it, the compound Mn_2O_3 , which eventually changes to binoxide enveloping in excess the sulphate formed.

The admirable process introduced by Mr. Laster enables the pharmacist to overcome these difficulties, and is thus briefly stated by him:

“Take of Bin oxide of Manganese, 40 parts,
Hydrochloric Acid (Commercial), 200 parts.

Dissolve the bin oxide in the acid, beneath a chimney flue, and when solution is complete and chlorine no longer evolved, mix very gradually sulphuric acid (53) parts with the reddish liquid; continue the evaporation beneath the flue until acid vapor is no longer driven off, and the mass becomes dry. Dissolve this mass in water (350 parts) heated to the boiling point. Treat this solution with carbonate of manganese until it becomes rose red, filter or decant, evaporate and crystallize.”

Unlike the objectionable article of the U. S. Pharmacopœia,

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the sulphate of managanese* prepared according to Laster's new method contains no arsenic, and is otherwise possessed of the usual properties of the pure salt; this sulphate can be employed in the preparation of the carbonate, phosphate, and lactate, by the usual processes of double decomposition.

IODIDE OF MANGANESE.—This preparation dissolved in syrup is formed, according to the U. S. Dispensatory, by dissolving iodide of potassium and sulphate of managanese in water, sweetened with syrup; and mixing the resulting solutions; by double decomposition, iodide of manganese and sulphate of potassa are formed, a portion of the latter salt precipitating from its sparing solubility.

To prepare this iodide Mr. Laster has devised the succeeding formulæ, either of which he hopes will meet the requirements of the pharmacist and medical practitioner :

“Take of	Iodide of Calcium,	grs. 142,
	Sulphate Manganese,	grs. 86,
	Water, at boiling point,	pint 1.

Dissolve the sulphate in one-half of the water heated to the boiling point, and the iodide in remainder; mix the solutions, continue the boiling for ten minutes, and, after subsidence of the precipitate, and while solution is warm, filter and evaporate to dryness. Or,

Take of	Iodide of Lead,	grs. 220,
	Sulphate of Manganese,	grs. 87,
	Water,	ounces, 20.

Dissolve the sulphate of managanese in the water heated to the boiling point, and add the iodide of lead portion-wise, observing to stir the contents of the capsule after each addition; when all the iodide has been introduced, continue the boiling for fifteen minutes, then filter and evaporate to dryness.

In the first process the resultants of the decomposition are iodide of manganese and the insoluble sulphate of lime; in the second, the same iodide is formed, and at the same time sulphate of lead is precipitated; the insoluble compounds are removed

* This remark is unjust. There is no process given in the United States Pharmacopœia, and the tests given in the official list indicate a pure salt.—EDITOR AMER. JOURN. PHARM.

by filtration; in either instance a slight excess of sulphate of manganese is employed to insure the complete decomposition of the calcic and plumbic iodides.

The water of crystallization in sulphate of manganese being variable, Mr. Laster is always accustomed to dry the sulphate used at a temperature of 400° ; dried at this temperature, the preparation has a uniform constitution, which is not the case when the crystallized salt is employed.

On some other occasion the therapeutical uses of this and various other preparations of manganese may be referred to; but I would remark that it is especially in case of poverty of the blood, hypertrophy of the spleen, urethra vaginal catarrh, but more especially when in combinations with iron, that benefit may be derived from the exhibition of the manganic salts. In strumous, syphilitic, or cancerous affection, and in abnormal states of the nervous system dependent on deprivation of the blood, or exhaustion from venereal excesses, the syrup of the iodide of manganese may be used with advantage.—*Richmond Med. Journ.*, Jan. 1868.

A VISIT TO VESUVIUS.

NAPLES, May, 1867.

The outline of Vesuvius against the eastern sky, always visible from the quays of Naples when not obscured by clouds, is an object upon which the eye of the traveller rests with abiding interest. Much as there is to attract in other directions, this historic mountain with its incidents is the leading object that draws so many to this populous and interesting city. Seen now from this point, the mountain rises beyond the bay as a flattened cone, the apex of which has been removed and a deep notch cut in its substance, giving it the appearance of a double-headed mountain. The buildings of various kinds which dot its base are very numerous, and it is said that a population of 70 to 80 thousand domicile between Portici and Castelmare inclusive, on the south-western base of the mountain.

It having been determined to visit Vesuvius in the morning, a slight glance at some points of its history will aid us in appreciating its features, which we are able to give from the excellent account of Murray. The first eruption of Vesuvius in historic times was in the year A. D. 79, during the reign of Titus. It was recognized by the ancients, however, as of volcanic nature, and various traditions regarding it existed. Plu-

tarch describes Spartacus and his followers as encamping in the rocky hollow (crater) on the summit, which was clothed with wild vines and which was entered by a pass on the side towards Naples. This indicates the long quiescent period which must have elapsed preceding the eruption of 79. After several years of occasional subterranean disturbance in the vicinity of Vesuvius, during which earthquakes had damaged Herculaneum, Pompeii, Puzzuoli, etc., the great eruption of A. D. 79 occurred, which buried the two former cities. The account left by Pliny of the circumstances of this eruption, which occasioned the death of the elder Pliny, near Stabiae, corroborates the examinations of modern geologists that no lava issued from Vesuvius on that occasion, but that the eruption consisted in the ejection of vast quantities of ashes, water and mud, with prodigious quantities of stones and fragments of various volcanic matters. There must have been a strong current of air from the north which carried the loose matter, including stones of several pounds weight, as far as Pompeii, and lesser ones to Stabiae, and the present more gradual inclination of the base of Vesuvius in that direction is additional evidence of the immense bulk of these ejections, which at the distance of several miles were sufficient to entomb so extensive a city as Pompeii. While at the latter city we witnessed the laborers at work removing the ashes from a part of the excavations now going on, and obtained a specimen, which is of a uniform light stone color, very friable, no sand visible, and appearing as though it had assumed its present position in a comparatively dry state. The ejection of water and steam on that occasion appears to have been one of the most prominent characteristics of the eruption, and to have been the immediate cause of overwhelming Herculaneum with a torrent of mud formed of the light ashes which it gathered up in its descent along the mountain slopes to the bay, and which penetrated at once into every part of the buildings of that fated city; not however before most of the inhabitants escaped. Whether the water thus ejected was derived from a rupture of the earth's crust under the sea, is a fruitful subject of speculation for the geologists. The result of this eruption was to destroy the whole south-western wall of the ancient crater towards the bay, which was probably disintegrated under the influence of fire and superheated steam, (the power of which in effecting the decomposition of minerals, is well known in the chemical laboratory), and ejected as ashes and mud, changing the coast line so as to make the site of Pompeii half a mile inland, whilst it was formerly a seaport on the bay. The remainder of this old crater yet exists, as we shall presently see, a memento of this wonderful catastrophe. In the year 472 an eruption occurred, that again visited the sites of Herculaneum and Pompeii, which had become occupied by villages. Other eruptions happened in the years 512, 685, 993, 1036, 1049, 1139, 1306 and 1500. After the eruption of 1500, described by Leone, of Nola, the crater was "five miles in circuit, and 1000 paces deep," and remained quiescent for a hundred and thirty-one

years, during which period its sides became covered with vegetation, shrubs, and forest trees, and the floor of the crater even visited by cattle and other animals. In 1631 one of the greatest eruptions occurred; the immense crater just noted was filled with volcanic matter, and on the 16th of December an earthquake caused a violent irruption of the sea towards the mountain, causing great destruction of life, and at the same time "from the summit of the cone seven streams of lava issued, one reaching Torre del Annunziata, seen on the road to Pompeii, one destroyed two-thirds of Torre del Greco, a third destroyed Resina, on the site of Herculaneum, another destroyed part of Portici, and formed the present site on which the Royal Palace and La Favorita were subsequently built." This eruption was also accompanied by great torrents of rain, causing inundations towards Nola. Eruptions followed this in 1660, 1682, 1690, 1696, 1698, 1701, 1707, 1712, 1717, 1720, 1728, 1730 and in 1737, when an immense outpouring of lava occurred from the base of the cone, estimated at over 33 millions of cubic feet, lava also issuing from the summit. The quantity of ashes discharged during this eruption was very great and did damage to trees by its weight. Then in 1751, 1754, 1758, 1760, 1766, 1767, 1770, 1776 and 1779. This last was one of the most remarkable on record, being accompanied by an immense explosion in the interior, immediately following which, says Sir William Hamilton, "In an instant a fountain of liquid transparent fire began to rise. . . . The height of this stupendous column of fire could not be less than three times that of Vesuvius itself." The ejected matter fell partly on the mountain itself, partly on Somma and the intervening space, and partly eastwards toward Ottajano, where it broke in the roofs and windows of houses, destroyed the woods and vineyards and filled the streets to the depth of several feet with ashes, some of which fell a hundred miles off. In 1784, 1786, 1787, 1793—4, the latter destroying the cathedral and the greater part of the town of Torre del Greco, poured into the sea, extending the coast line out 380 feet, by width 1200, and 15 feet above the level of the water. Then in 1804, 1805, 1809, 1812, 1813, 1817, 1818, 1820 and 1822. On this last occasion the great cone fell in with a crash, after which two streams of lava flowed towards Resina. Sir Charles Lyell found this lava had not lost its heat in 1828. The crater was irregular in shape, three miles in circumference and of great depth, its rim varying 500 feet in height. Then in 1828, 1831 and 1834, when the lava ran nine miles, destroying Caposecco and threatening Pompeii. In 1838, 1845, 1847, 1850; the latter noted for enveloping the woods of Bosco Reale, when various curious phenomena occurred as the trees were consumed in the lava. In 1855 the lava flowed down into the Atrio del Cavallo, and keeping to the north of the Hermitage did much damage in the places below towards St. Sebastiano and Massa. This lava was remarkable for slow cooling and for containing chloride of lead as a sublimate in its fissures. Its direction caused at one time fears for Portici,

and the guides yet speak of it as the great eruption of 1855. In 1859 an eruption occurred on the side of the cone, a stream of lava running into the Atrio del Cavallo and thence on either side of the Hermitage hill, poured in a magnificent fiery torrent into the Fossa Grande on the north side. The eruption of 1861 vented itself in a fissure 2000 yards long above Torre del Greco, one vent pouring out lava, accompanied by severe earthquakes that nearly destroyed the town. This outlet was lower down towards the coast than any of the preceding. In 1865 the disturbance was confined chiefly to the old crater, which in May of that year was described as being 950 yards in circumference, and perhaps 300 feet deep. The observer remarked that the small sub-crater at the bottom would soon fill the cavity of the general crater. This is the latest account we can find, previous to our visit.

Our party, consisting of seven persons and the guide, left the hotel at five o'clock, A. M. The route after passing Castel Carmine, carried us along the *Marinella* or bay shore, which at that early hour was a busy scene, where boatmen and fishermen were actors, and where formerly the Lazzaroni were prone to bask in the sun. Passing the Ponte della Maddalena over the Sebeto, we soon entered Strada Portici, having the immense line of brick buildings, originally erected for granaries and now used as barracks, on the right. These and the continued walls and fences of houses and villas along the bay shore shut out the view of the water, and detract much from the interest of the ride. Some of the shops of Portici were open, and already strings of macaroni were hanging out to dry in front of the factories. We met several of the peculiar two wheeled vehicles, with long shafts harnessed above the backs of the horses, and which frequently bore as many as 18 to 22 poor passengers, sitting and clinging to them, bound to Naples from Resina. Passing the court yard of the Royal Palace we soon entered Resina, built on the site of Herculaneum, and where the Vesuvian guides have their head quarters. After making arrangements for the ascent, we drove on to the guides house on the outskirts of the town and ate our breakfast, and then each addressed himself to the important business of selecting a saddle horse from the lot in waiting. Our party embraced representatives from the medical, pharmaceutical, collegiate and mercantile professions, and despite the sorry nags, and ancient saddles upon which some were mounted, made quite a respectable cavalcade, at least in numbers. The weather was fine, almost too warm for such an expedition, the road, not intended for wheeled vehicles, was narrow stony, irregular, and hedged in by fences. Many trees were in bloom, and the almond and fig had set their fruits. The olive blossoms had not yet opened, but the rich scarlet flowers of the pomegranate here and there in the hedge rows, formed a brilliant contrast with the foliage. The vine grown on stakes, rude trellises and in festoons is the most important crop on these

fertile slopes. The road also served, in many places, as the bed of a torrent in rainy weather, so much was it washed, but after reaching the plateau it was better, and our view greatly improved, being less obstructed by immediate objects.

Far to the west lay Naples on its beautiful bay, and Posilipo, with the hills of Sorrento and Capri nearly south; whilst beneath us and around lay the accumulated lavas and ashes of the eruptions of eighteen centuries of the historic era, which under the disintegrating action of time have been coated by a fertile soil now teeming with the verdure of spring, wholly unmindful of the slender lease it holds on permanence. In glancing over the numerous villas and villages which stud the sloping sides of the mountain and the shores of the bay, it is nearly impossible to realize that this is the grand theatre of the terrible and sublime eruptions that we have hastily enumerated above.

Continuing our journey mountainward among vineyards and orchards, we abandoned the road and entered a lateral path, a change rendered necessary by the proximity of the lava of 1859, which destroyed the excellent carriage road, built by government, leading to the observatory and hermitage. Subsequently we saw the point where the road passed under the lava. Our route now passed over the lava of 1859, which has to be crossed to reach the hermitage. The path is very rough, but will soon become sufficiently worn to serve the purpose. The recent bed of lava is here spread out very wide, and extends to the base of the cone. It is impossible to describe the appearance of utter desolation it presents; the surface is covered with broken masses of every size and shape, mixed up with and partially surrounded by the most curious convolutions of solidified melted matter like masses of fossilized intestines of some gigantic animal. The cooling power of the atmosphere is so great that very soon after the lava reaches the plateau, where its progress is less rapid, the exterior becomes chilled, especially at the edges, and as the pressure of the interior fluid mass urges it forward the crust is broken into fragments, enabling the lava to escape, and in its turn to be chilled, until a period in its progress arrives when the crust is capable of resisting the diminished pressure of the partially cooled interior. It is this incessant action of the interior on the exterior that gives the peculiar vermiculated character to the surface of the lava. In color, this lava is nearly black, extending for miles, filling up ravines and valleys, and pouring over precipices, and in one spot in approaching the hermitage forming an abrupt wall of slag-like matter thirty or forty feet high. The path passed near one of the small craters of the eruption of 1859, but we did not leave our horses to examine it. Before reaching the Hermitage, we arrive at a point where the lava of 1855 is seen. Its color is less dark, indicating the effect of the atmospheric agencies, but yet devoid of life, saving a very few plants that have rooted in some of its crevices. The Hermitage stands on a bluff or spur of the old Mount Somma, just at the opening

of the crescent-shaped valley called *Atrio del Cavallo*, between the cone of Vesuvius and the interior walls of the old crater of Somma, and no more admirable spot could be chosen whence to witness an eruption, though its proximity is sometimes attended with danger, as in 1855, when the current passed on both sides of the hill. We now pushed on up the steep path of the Hermitage hill and over this lava, and entered the *Atrio*, where the path is more or less broken as it passes over the lavas of various ages, and requires great caution on the part of the animals to keep their feet. The scene here is worth pausing to view; on the left extending far in advance are the abrupt rocky walls of the old crater of Somma 800 feet high, with various flowering plants established in its crevices, but far too sparse to form a continuous covering to its desolate lineaments; on the right rises the vast cone of Vesuvius, dark and sombre, and lifeless externally, more than a thousand feet perpendicular above the path, which is in the middle of the valley. About two miles beyond the Hermitage, the path gradually rising, we reach the place of ascent, which is an inclined plane, constructed of fragments of lava of all sizes thrown irregularly together so as to form a sort of stairs, the stones giving a tolerable foothold, but without any order or regularity. Dismounting, our horses were taken by boys, each of whom claims his pay in due time. Then came a busy scene; the numerous men employed to aid in the ascent, such as desired it, vociferously urged their claims. Two of our party employed a sort of sedan chair arrangement carried by four men; most of the others received aid by a strap held by a man in advance, whilst two of us depended solely on our own muscle for the ascent. It was near noon, very warm for the season, and illy prepared by a partial breakfast, we addressed ourselves to the task. In recurring to the effort it required to mount this gigantic stairs, it certainly was more tiresome than the more difficult and varied ascent of Mount Washington; but this arose from the monotony of the labor, and the want of objects to attract the attention during the effort. We found it necessary to rest at intervals, but accomplished the task in about an hour, certainly one of the least acceptable ever undertaken. But on gaining the top we were repaid. Far below us were the sedans slowly creeping up, with foot passengers scattered on the way. Our horses looked like dogs in size, and the men like ants or pebbles, according as they were in motion or quiescent, so diminutive did they appear a thousand feet below us. The irregular motion of the sedan must be attended with some suspicions of danger by the uninitiated. From the edge of the cone to the edge of the crater at this point, is perhaps a furlong, covered with scoria, ashes and masses of lava. On reaching the crater, judge of our disappointment in finding a central conical mass rising in the centre, higher than the highest edges of the crater, which was filled nearly to the edge with solid blocks of lava without any abyss, or indication of internal activity, not even visible vapor. The lava was rent in all directions, as if by the cooling and subsidence of

the mass beneath. It was of a dark gray color, very hard and sonorous when struck. Passing around to the south or highest side we saw a number of laborers engaged in an excavation on the inside of the edge of the crater near the top, gathering sulphur into bags, which they carried on poles to the place of descent. It is very impure and used only for the vine disease. We seated ourselves here, and whilst enjoying one of the grandest panoramas in existence, partook of the lunch brought up by our guide, and, in the absence of water which had been forgotten, substituted some very good Lachrama Christi, the well known wine of Vesuvius. The view was superb. The entire bay of Naples, its enclosing islands, and the promontories of Sorrento and Misenium; Naples spread out like a map, the distant Appenines on the one hand, and the Mediterranean on the other, whilst below, beyond the base of the cone were the lavas of latter times, and further down the villas, peasant houses and villages that numerously dotted the gently inclined base of the mountain down to the towns along the bay shore. Six miles off lay disintombed Pompeii, whilst all around, but more especially toward the bay, lay the scene where the terrible eruptions of centuries have vented their fury, and piled up stratum on stratum of ashes and lava and scoria. Leaving the sulphur gleaners at their disagreeable labors, we continued around the edge of the crater, the highest point being nearly south, towards Pompeii; from here the cone of scoria stones and ashes in the centre of the crater is seen to the best advantage, and a considerable depression existing on this side affords a better idea of a crater than on the other. In completing the circuit we had walked about three-quarters of a mile. The guide now conducted us over the dislocated blocks of lava by a very irregular route to the central cone, stopping on the way to put some eggs in a crevice to be cooked by our return. The actual elevation of the central cone was not known, but it was probably thirty or forty feet above the lava upon which we crossed. It consists of ashes, stones and scoria, the latter of various shades of color, from gray and yellow to orange red and almost vermillion red. From a spot on one side sulphurous vapor issues, and our guide, by thrusting in a piece of paper, caused its ignition. This and the heat sensibly felt issuing from some of the crevices in the lava, were the only indications that the energy of the volcano, though dormant, still existed, and by the old rule of a full crater may be expected to rouse itself ere long. After a full view of the cone itself and the surrounding crater from this point, we returned across the lava bridge, securing the cooked eggs *en route* and soon arrived at the place of descent. This is along side and east of the route of ascent, and is an inclined plane of loose ashes. The only care requisite is to keep erect, and use the feet as in walking as fast as possible, each step causing a descent of from three to six feet, according to the energy of the traveller, the trip down being made in about ten minutes. Sometimes the most ludicrous scenes occur in this journey by persons losing their

balance and pitching or sliding in the dust. On reaching the valley a busy scene ensued in regaining our saddles, when several found themselves differently mounted, some for the better, and commenced our downward trip. We stopped a little while to rest at the Hermitage, where water was obtainable for the first time since our leaving the coast, and we soon converted our lemons and sugar into lemonade that tasted like nectar, so needed was the cooling beverage after the ordeal we had gone through. Half a day might readily be spent here by the leisure traveller, but our party soon resumed their saddles and returned to the carriages at Resina without further incident, thoroughly fatigued but highly gratified with the visit to Vesuvius.

[Many of our readers are aware that, since about the middle of December, Mount Vesuvius has been in active eruption, and the prognostics of last May have proved correct. The opportunities for witnessing the phenomena are said to have been unusually favorable. The first flow of lava was eastward towards Ottajano, but the more recent currents have been in the Atrio del Cavallo, and down over the lava of 1859, described above. One portion of the stream passed near the observatory and thence toward Resina, and the other made in the direction of Torre del Greco, but the volume was not great enough to continue the current so as to endanger that town. One observer describes a shower of red hot stones, and rocky masses of tons in weight, ejected to great heights, falling in all manner of curves, some within and some without the crater, whilst other fiery masses, falling on the flanks of the cone, would rebound down its sides in great leaps until shivered to pieces or lodged by some impediment. The ascending and descending lines of fire crossed each other in all directions over the crater, presenting a display of natural pyrotechny of surpassing grandeur and beauty, whilst vast volumes of smoking vapor issuing from the crater, extending from above the mountain towards Capri, formed a vast arch, reflecting back the light from the crater and lava streams. Those who have recently traversed the scene of these phenomena, when all was quiet and peaceful, can fully appreciate the wonderful transition.—W. P., JR.]

Varieties.

International Weights and Measures.—The Committee of Weights, Measures and Coins, at the Universal Exhibition of Paris, 1867, have made their official report relative to units of measure and weight. The commission advocates the following measures: The prompt substitution, in all its integrity, of the metric system, for the old systems of weights and measures, as it is practically adopted in several other countries in the west of Europe. This system, introduced and legalized optionally, cannot be at once rendered imperative to the exclusion of every other system. A cer-

tain delay is necessary for the change; and the different nations are alone capable of fixing its duration. Let us observe in the meantime that experience in several countries has proved that a too long delay does not have the effect of sensibly facilitating the accomplishment of this task. Thus it is desirable that Governments take, henceforth, the following measures, viz.:—

1. To order the teaching of the metric system in public schools, and to require that it should form part of the public examinations.

2. To introduce its use into scientific publications, in public statistics, in postal arrangements, in the custom houses, and other branches of Government administration.

3. The commission does not consider, as appertaining to its mission, the duty of making standards the exact prototypes of those of Paris. The Government of each country will take upon itself the verification of each of these standards.

The commission declares that the present report contains the expression of its deliberations and conclusions. It expresses a wish that different nations will yield to the solicitations of science and the manifestation of opinion.—*Lon. Chem. News*, July 12, 1867.

Castor Oil Bean in California.—The San Francisco Bulletin says: The experiments made last year in cultivating castor beans in this State may be set down on the whole as successful. And yet the success was not so as to warrant any very heavy ventures in this direction.

The bean plant grows luxuriantly and the yield is very great, surpassing, in those instances which came under our observation, that of any other oil seed save the sunflower. But there is no way of gathering the crops known to our people, which dispenses with a large amount of hand labor. The seeds do not ripen simultaneously, but a few only at a time, ranging over a period of several weeks. If the seeds are not gathered as soon as ripe the balls snap, the beans are scattered over the ground, and in that condition are hardly worth the cost of gathering. When labor can be had cheap, as for instance that of children or Chinamen, no doubt the crop can be raised at a large profit.

The beans will even plant themselves and grow with very little attention, often monopolizing the grounds to the exclusion of weeds. But the trouble is they cannot gather themselves, or ripen so that a clean job can be done by any agricultural machine yet invented. There is likely to grow up here a large demand for the castor bean, and no doubt the difficulties we have noticed will be finally overcome. The making of castor oil will soon come to be a special business, and we may say that much more skill is required in the manufacture of merchantable castor oil than is required in the production of any other of the vegetable oils. With a powerful press the grinding process may be wholly dispensed with; but the bleaching and clarifying process requires considerable skill and some knowledge of chemistry.—*Jour. App. Chem.*, May, 1867.

Editorial Department.

PHYSICIANS PRESCRIPTIONS; SHOULD THEY BE RENEWED WITHOUT A WRITTEN ORDER?—During the past year several portions of the medical profession have been exercised on this subject, and many articles have appeared in the medical and pharmaceutical journals bearing upon it. Beyond this, and brought into the discussion by some of the writers and speakers, various charges and allegations of malpractice or unprofessional conduct have been adduced as calling for united action on the part of the medical profession to abate it on the part of the apothecaries. The East River Medical Association of the City of New York, in a communication to the Association, set forth certain resolutions it had passed some months before, and requesting their consideration, and which were previously printed in the September number of this journal. Owing to the late period at which they were introduced, they were not considered, but passed to the next meeting of 1868 with other unfinished business. By comparing the original resolutions published in our journal with the resolutions as presented to the Association, a marked difference will be seen, the word "pecuniary" and others being omitted in those presented to the Association, which, in our opinion, was honestly and openly expressed in the Society, and should have been sent unaltered to the Association. They considered their pecuniary interest injured by the repetition of prescriptions without an order, and hence in great measure arose the movement for which a good reason had to be given; and in the second resolution this is found, viz.: That the practice of renewing prescriptions without orders endangers the interests and lives of patients. If the matter is kept on this basis, and the physician will live up to it, that is to say will take the *grave responsibility it involves of refusing his patient the medicine he has ordered, unless it is again ordered in writing*, all honorably disposed apothecaries will cheerfully accede and in good faith carry out the arrangement. But it cannot be done otherwise. Let the prescription carry on its face, either printed or written, the direction not to repeat without a written order from the physician, who should sign and date it. The patient can then see it, and the very fact that he presents it is an acknowledgement that he agrees to the contract with the physician and will abide by it.

In matters of this kind usage is law, to a great extent, and the customs of the old countries from which we derived our ideas of medical and pharmaceutical practice is quite contrary to the view of the resolutions, it being the universal custom to return the original prescription to the patient or his representative, and this is equivalent to giving him the right of renewal. Here custom has to a great degree sanctioned the retention of the original prescription by the apothecary who usually, when requested, gives a copy to the patient, but not otherwise. Custom also

sanctions the repetition of prescriptions by the verbal request of the patient or by the simple presentation of the label, and this custom is based, in nine cases out of ten, on the verbal direction of the physician to the attendant, and of which the apothecary can have no personal knowledge. With this custom so deeply impressed on the habits of the physicians themselves, and on the heads of families, how is it possible to adopt any such general and sweeping rule as the East River Medical Association's Resolution, viz: "That we respectfully request that no druggist will renew the prescriptions of any physician connected with this Society, without due authority for each and every such renewal." Physicians may be called out of town unexpectedly, may omit a visit after directing the medicine then prescribed to be continued, or may *forget* to give the written order for renewal, and in various other ways come in conflict with such a rule. How then is the apothecary to act? Must he take the responsibility to supply the medicine, or, entrenched behind the letter of the order, let the patient suffer until he has permission to get the means of relief under the red tape of authority?

That ill consequences have flowed from the injudicious continuance, by repetition, of prescriptions, none can doubt who for a series of years have been engaged in an active business; but the mischief thus occurring would, in our opinion, be but a small fraction of that which would arise from the strict carrying out by apothecaries of the rule as promulgated by the East River Medical Association.

As regards the other charges perhaps the most serious one is that of giving advice, or, as it is termed, prescribing over the counter. That this is done to some extent in many neighborhoods can hardly be doubted. The wonder is not that it is done, but how in some places it can be avoided. Much of the prescribing is for the very poor, to whom in many cases it is a real charity. A large portion of it is done by medical men who are the proprietors of stores, and the example of such does not tend to prevent the apothecary proper from doing likewise. Both practically and theoretically we have honestly advocated the separation of the Medical function from Pharmacy, and shall continue to do so in justice to the physician (and the patient) in all cases appropriate for his aid, but we believe in all stores and in every neighborhood there is a certain amount of information that will always be expected at the hands of the apothecary, and to refuse which would destroy much of his real usefulness to society.

The charges of interfering with physicians, criticizing them before patients, substituting one medicine for another, etc., are so gross and indefensible that we shall only state them to denounce them as not to be justified on any grounds, and so far as we know they must be confined to a limited class. We believe the true interest of physicians and apothecaries should lead them to the utmost friendliness and candor towards each other in ethics. The reputation of the physician should be as dear to the apothecary as his own, and he should always be ready to uphold it

as part of his duty so long as it is beyond reproach, by the observance of those ethical rules embraced in the paper of advice issued jointly by the County Medical Society of Philadelphia and the College of Pharmacy.

THE COLLEGE BUILDING.—The Committee of sixteen having in charge the subject of obtaining a new College Hall have, since our last issue, sold the present building for the sum of \$15,000, and are proceeding to raise the necessary additional funds required to erect the new building, by an appeal to the pharmacentists and druggists of Philadelphia. Several liberal contributions have been made, and already one-half of the sum needed has been raised. As the new building is intended to embrace a much more liberal accommodation for the convenience of members; and as it is hoped that the usefulness of the College to the members personally will thereby be greatly enhanced, it is particularly desirable to interest all the members in the project, so that when it gets into operation they will be prepared to take part in carrying forward the improvements in the management of the College affairs which it is proposed to inaugurate, including a reading room and museum.

KANSAS COLLEGE OF PHARMACY.—We are informed that a convention of druggists and pharmacentists met at Leavenworth, Kansas, on the 12th of November, 1867, to inaugurate a Pharmaceutical Association for that State, and that the following list of officers were elected on that occasion:—

W. S. Greene, of Topeka, for *President*; T. O. Bigney, of Leavenworth, and B. W. Woodward, of Lawrence, for *Vice-Presidents*; Robt. J. Brown, of Leavenworth, for *Secretary*; R. Parham, of Leavenworth, for *Treasurer*; and Messrs. Egersdorff, Armes and Brecklein for *Trustees*.

It is proposed to seek an act of incorporation. We will be pleased to receive information of the progress of the Society, which has our best wishes.

BOSTON JOURNAL OF CHEMISTRY.—During the past year a monthly sheet has been issued under this head, in Boston, by J. R. Nichols & Co. The sheet contains a selection of items of general interest, with some original communications, and is neatly printed. Price, 50 cents per annum.

TOURTELOT'S EXTRACT OF BEEF.—This form of extract of beef is now prepared in vacuo by the Messrs. Tourtelot, of Chicago, of a quality equal to the best in the market, and put up in small jars for convenience. Its consistence is nearly as firm as the extract of Borden, and claims to be more readily soluble, from retaining a portion of moisture. We have observed it during the past two months under circumstances favorable for change, if disposed to spoil, and it has retained its characteristic odor and appearance,—a permanence not possessed by their former less con-

centrated extract. It is strongly recommended by medical officers of the army, who have extensively used it in hospital practice.

A Manual of Inorganic Chemistry, arranged to facilitate the experimental demonstration of the facts and principles of the Science. By Charles W. Eliot and Frank H. Storer, Professors of Analytical and of Industrial Chemistry in the Massachusetts Institute of Technology. Second edition, New York; Ivison, Phinney, Blakeman & Co., 1868; pp. 664, 12 mo.

A pretty thorough glance over the pages of this book has left an impression highly favorable to its merits as a "Manual of Inorganic Chemistry." It is written in a style at once agreeable and effective, arranges the subjects in natural groups, and at the commencement demonstrates every step in advance by experiment, until the student is rendered familiar with the analytical and synthetical methods of chemical investigation, and brings in, where most appropriate, the discussion of principles and the explanation of processes, laws and methods, so as to impress the beginner in each case with an example in the discussion of the subject then before him.

Commencing with oxygen, nitrogen and hydrogen, air and water are very fully considered, and in the demonstration of their composition the nature of atoms and molecules, the processes of distillation and solution, the diffusion of gases, the nature of combustion, flame and oxidation are explained. At this early stage ammonia and its composition and relationships is discussed, followed by the explanation of empirical and rational formulæ, impressing the student with the nature of those two schemes of composition, carefully guarding him from too great a reliance on the latter.

The chapter on chlorine compounds commences with the nature, preparation, and uses of hydrochloric acid before speaking of chlorine, after which the other compounds of chlorine, followed by bromine, iodine and fluorine. The next chapter, a most interesting and instructive one, is on ozone and antozone, in which the remarkable properties of these modifications of normal oxygen, as far as their occult character will permit, are developed.

The sulphur group is then discussed, in which the nature of the processes of crystallization are explained, followed by the subject of combination by volume as applied to the numerous gaseous compounds previously noticed. Phosphorus, arsenic, antimony and bismuth are grouped together as in close relation to nitrogen. Here toxicological researches bearing on the subject are brought in, and the process of liquid diffusion as developed by Graham under the name of dialysis applied and explained.

The next group is carbon boron and silicon. Under carbon some of the leading subjects in chemical philosophy are brought in; also the properties of charcoal as a disinfecter, absorber, reducer and decolorizer. The authors, in considering the important relations of carbon with organic matter, use the following language: "The best definition of the so-called

organic chemistry which can be given to day, is, that it is the chemistry of the compounds of carbon. The department of organic chemistry has grown out of ordinary chemistry solely because of the fact that the compounds of carbon with hydrogen, oxygen, and nitrogen are more numerous, and often of more complex composition than the compounds found by any of the other elements. These compounds of carbon with hydrogen, and with the other elements, are all definite chemical compounds, conforming to the law of multiple proportions; but they count by thousands, and the mere enumeration of their names and properties would fill a volume." Under carbonic acid, respiration, fermentation and ventilation are brought in, and under carbonic oxide, the whole subject of flame, combustion, lamps, furnaces, blowpipes, etc.

The alkaline metals sodium, potassium, and the ammonia salts are in the next group, including alkalimetry, the soda manufacture, saltpetre refining, glass, etc.

Silver is classed with lithium, rubidium, caesium, and thallium, in which chapter spectrum, analysis and photography are treated of, and that property or tendency of elements to combine with one, two, three or more volumes of hydrogen, which is now understood by the generic term quantivalence, and the specific terms *univalence*, *bivalence*, *trivalence*, etc.

Calcium, strontium, barium and lead are a group—magnesium, zinc and cadmium, another; aluminium, glucinum, chromium, manganese, iron, cobalt, nickel and uranium are brought together as the *sesqui-oxide* group, having certain properties in common but varying in others. The alums are here brought in.

Copper and mercury; titanium and tin, molybdenum, vanadium and tungsten; and finally gold and the platinum metals, with some concluding remarks on atomic weights, specific heat and chemical manipulations in the form of an appendix.

The book is handsomely printed and carefully proof-read, and is a very creditable addition to our chemical literature.

An introduction to Pharmaceutical Chemistry, by John Attfield, Ph. D., F. C. S., Prof. of Practical Chemistry to the Pharmaceutical Society of Great Britain. London: John Van Voorst; pp. 477, 12 mo.

This is a period fruitful in books on chemistry. Formerly these works, appearing at long intervals, embraced the whole scope of the science, but now-a-days we have them adapted to manufacturing, physiology, toxicology, analysis, medicine and pharmacy. In the instance before us the object of the author is to teach general chemistry practically with a view to its use by the pharmaceutical student, quite a different sense from that of "Wittstein's Pharmaceutical Chemistry," which teaches the best processes, in the author's opinion, for preparing Pharmaceutical Chemicals, and in

our opinion is as fairly entitled to the adjective as the volume of Dr. Attfield, which is really an introduction to practical chemistry in its relations with the education of the pharmacist, being intended primarily as a text book for students in the laboratory of the Pharmaceutical Society at London, and as an aid in the study of chemistry by the pupils of medical practitioners and chemists and druggists.

The style of the work is unique. The familiarity of the author with what he would teach is apparent at every step; beginning with the characters of the most important element, he carries the student on until he is presumed to have acquired a certain definite idea of the chemical qualities of matter, when combination and atomicity is considered, and the language of symbols discussed sufficiently to enable the students to understand formulae and equations. The etymology of standard words of classical origin is carefully explained in course, and the new terms, of which many have crept into use in latter times, are duly explained, such as *quantivalence* and its relatives *equivalence*, *bivalence*, *quadrivalence*, etc. The author endeavors from the first step to give the student clear ideas of synthesis and analysis, and under each element treats of its synthetical and analytical reactions under separate heads, and claims for this method a decided advantage in teaching the chemistry of the pharmacopoeia. Whenever a medicinal chemical is treated of the author brings in the official names of preparations derived from it, in italics.

The acids are considered after the metals and salts, instead of before, as is usual, commencing with hydrochloric acid and other hydrogen acids, and proceeding through both mineral and organic acids which have known radicals, and then to those of less importance. Short notices of the more important alkaloids and modes of testing for them are given; then follow the starchy, saccharine and neutral active principles, alcoholic bodies, &c.

The last quarter of the volume is devoted to toxicological analysis, the examination of morbid urine and calculi, and to quantitative analysis, both volumetric and gravimetric, prefaced by a notice of weights, measures, and specific gravity. A series of questions for the use of students concludes the book.

As a text-book for the practical laboratory, and for home students who wish to acquire practically a knowledge of pharmaceutical chemistry, this volume will prove very useful, but it is not so well calculated for the study of theoretical chemistry, as usually taught by lecturers in the United States.

Plastics; a new classification and a brief exposition of Plastic Surgery.

(A reprint from a report in the Transactions of the Illinois State Medical Society for 1867). By David Prince, M. D. Phila.: Lindsey & Blakiston, pp. 96 octavo.

Plastic Surgery is said to be "that department of operative surgery which has for its end the reparation or restoration of some lost, defective,

mutilated or deformed part of the body." The various important operations which constitute this department of surgery, very much belong to more recent times, and for want of a general understanding among surgeons in regard to the language used in describing or naming them, the author thinks loss has occurred. In the work before us he proposes to give form and character to the language of Plastic Surgery, and to present what is known of the art in a brief but connected treatise. Those who are able to judge of its merits, speak favorably of its claims as a résumé of the existing state of the art.

Annual abstract of Therapeutics, Materia Medica, Pharmacy and Toxicology, for 1867, followed by an original memoir on gout, gravel and urinary calculi, by A. Bouchardat, Prof. Hygien, &c., to Medical Faculty of Paris. Translated by M. J. De Rossett, M. D., adjunct to the Prof. of Chemistry in the University of Maryland, &c. Phila.: Lindsay & Blakiston, 1868, pp. 314.

Some of our readers may recognize in this volume an old friend in a new dress. Bouchardat's "Annuaire," is now in its 27th year, and embodies a store of valuable information, gathered from the medical and pharmaceuticals journals, chiefly those of the continent. In rendering the quantities of formulæ, as a general rule it will be safer to use the original quantities as they may be intended for extemporaneous use. We observe several variations from this rule to avoid fractions. The book is neatly gotten up, and will afford physicians an annual exposé of the novelties in French therapeutics, chiefly gathered from the journals.

Braithwaite's Retrospect of Practical Medicine and Surgery. Part LVI, January, 1868, American Edition. New York, Townsend & Adams. 1868; pp. 333.

This excellent half-yearly digest of British medical and surgical papers is too well known to need explanation. The volume just received has the usual variety of subjects, and should be on the table of every practitioner. Lindsay & Blakiston, and J. B. Lippincott & Co., are Philadelphia agents.

The Half-Yearly Abstract of the Medical Sciences; being a digest of British and Continental Medicine, and of the progress of medicine and the collateral sciences. Vol. xlv. July to December, 1867. Philada.: Henry C. Lea; pp. 288.

Contains very much of interest to the physician, and is too well known and appreciated as a standard semi-annual to need other notice than the announcement of its issue.

OBITUARY.—Notices of the Death of Mr. WARRINGTON, of Apothecaries Hall; and Dr. DANBERRY, of Oxford, are necessarily crowded out.